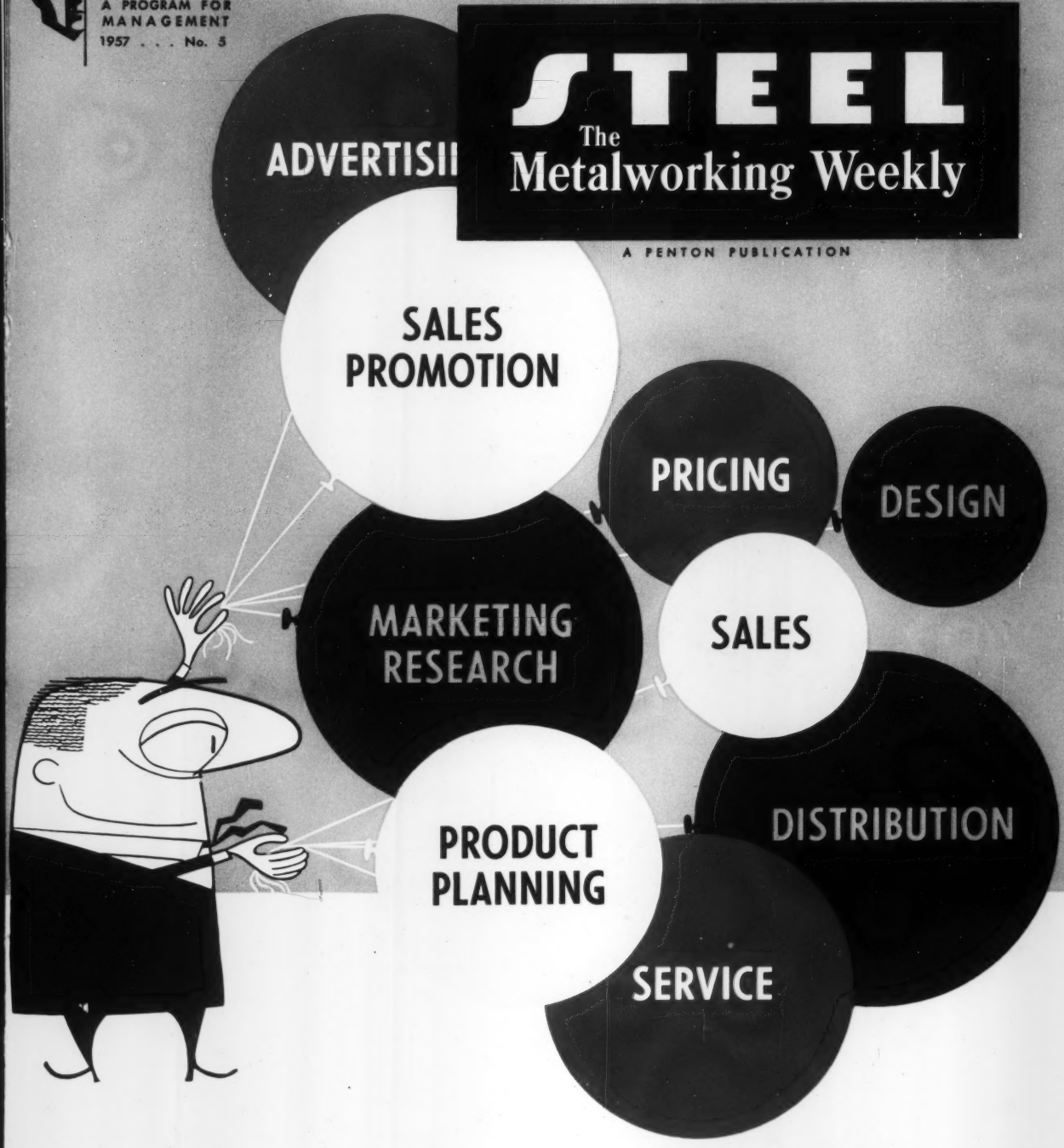
A PROGRAM FOR MANAGEMENT
1957 . . . No. 5

JUNE 17, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



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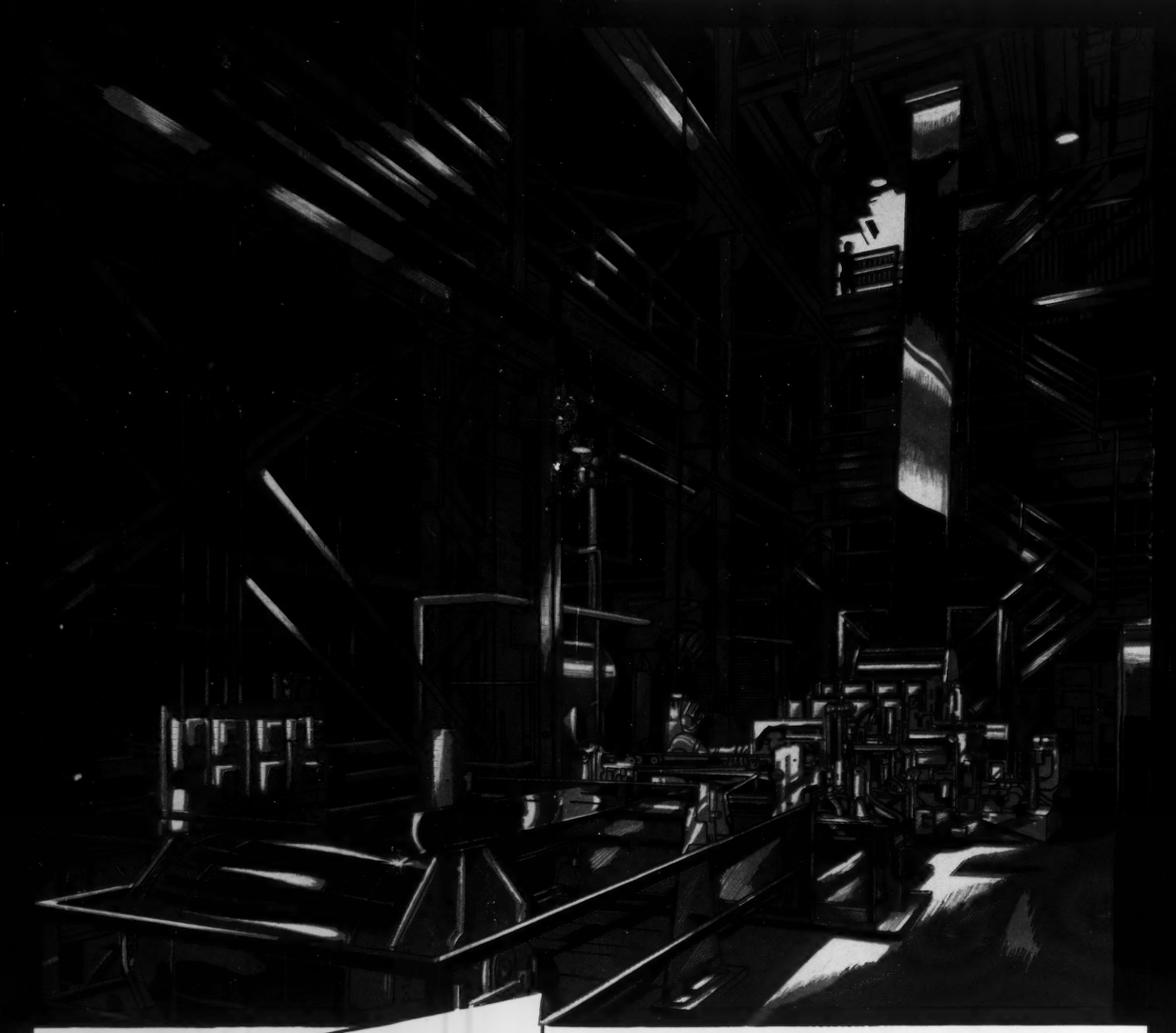


New Ideas IN EQUIPMENT FOR CONTINUOUS COATING LINES

● New ideas recently developed by Aetna-Standard make Continuous Coating Lines more efficient. One idea focuses on a new approach for **Loop Cars.** The use of Loop Cars eliminates deep loop pit excavation and keeps strip in full view for easier inspection.

New Aetna ideas contribute to an even better finished product. Space saving in the installation results in lower first cost. There is less equipment to buy and to install.

Aetna-Standard has installed more Continuous Galvanizing Lines than all other manufacturers combined.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES ● CONTINUOUS ELECTROLYTIC TINNING LINES ● SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT ● CONTINUOUS BUTT WELD PIPE MILLS ● SEAMLESS TUBE MILLS ● DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT ● ROLLS AND CASTINGS ● EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

OD 15 in., Right on the Nose

That was one of the specifications: outside diameter, 15 in. Very little tolerance; had to be almost exact. And it was, when it came from the Bethlehem machine shops for checking. Right on the nose!

There were other interesting specs that applied to this Bethlehem forging, and its twin. The two pieces are return cylinders for an extrusion press. The buyer required that they be 100¼ in. long. Bore was to be 1 ft for a distance of 87½ in.; then 7¾ in. for the remainder of the length. Ticklish work? Sure! But Bethlehem machinists were equal to it.

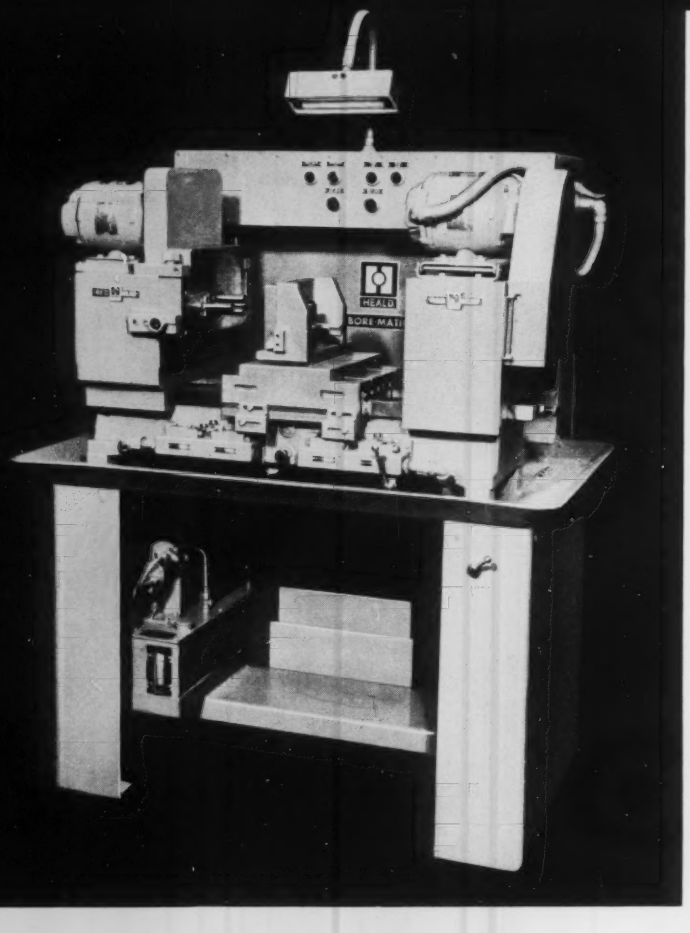
Bethlehem is recognized as a producer of forgings in all sizes—from the heaviest ever needed to pygmies weighing a pound or less. But we'd like to emphasize that Bethlehem services go beyond this point. The order described here is a good example. Whatever we forge, we can machine—and do a thoroughly expert job.

With its integrated set-up, Bethlehem is always able to handle your requirements. Call us when in the market for large or small forgings, and give us machining specifications. They'll be followed to the letter.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



HEALD ANNOUNCES A

New Concept

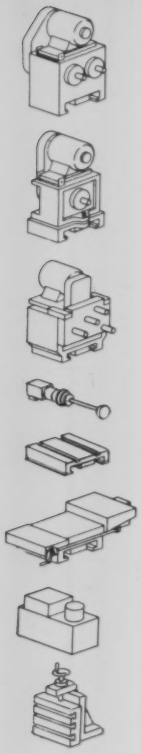
IN BORIZING VERSATILITY

It's the **UNIT-TYPE** Bore-Matic that puts custom-built machine design on an "off-the-shelf" basis!

HERE, for the first time, is a small, compact Bore-Matic precision finishing machine that gives you complete flexibility of design. Its unique "building block" arrangement, with standard interchangeable head units and accessories, provides practically unlimited versatility for meeting all of your small-work Borizing requirements with minimum machine investment.

Basically, the Model O Bore-Matic consists of a precision-built base-way unit with hardened and ground box-type ways, hydraulically operated table, hydraulic power unit and all necessary controls. A variety of Boringhead units, complete with motor drive, can be interchangeably mounted on the table ways at either or both ends of the machine with precise alignment.

This Model O unit is built to the same high standards of accuracy and precision as any other Heald Bore-Matic. It will easily hold tolerances of .0002 on regular production work and is capable of the same type of Borizing operations as a larger Bore-Matic. Because of its great versatility and relatively low cost, it extends the advantages of Heald precision to specialized operations and small shops where other types of equipment have previously been used. Ask your Heald representative for complete information, or send for a copy of new Model O Bulletin.



THE MODEL O BORE-MATIC CAN USE THESE STANDARD UNITS IN ANY COMBINATION

BORINGHEAD and DRIVE UNIT for one or two Red Head Boringheads.

SWIVEL BORINGHEAD and DRIVE UNIT for single Red Head Boringhead—swivels 20° for taper boring and turning.

MULTI-SPINDLE BORINGHEAD and DRIVE UNIT for miniature precision Red Heads. Interchangeable spindle plates bored for any practical number and location of heads, as close as ¾" on centers.

HYDRAULIC CROSS-FEED UNITS for standard and Multi-Spindle boringheads — permit grooving and facing with rotating tools.

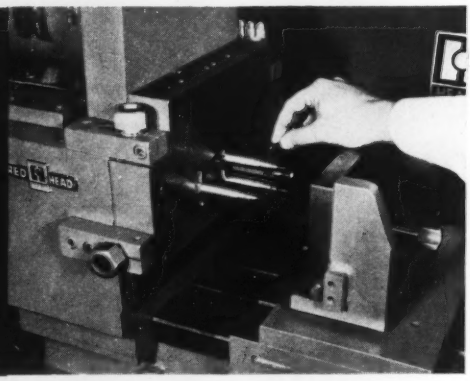
HYDRAULICALLY-OPERATED TABLE with rack and pinion drive—for mounting work or tooling which does not require indexing.

HYDRAULIC OR MANUAL CROSS SLIDE attaches to machine in place of table — permits indexing of work or tooling.

COOLANT PUMP and TANK UNIT with chip basket—for wet Borizing.

VERTICAL SLIDE mounts on table or cross slide — for manual vertical indexing of work.

NEW MULTI-SPINDLE Boringhead permits simultaneous multiple-hole Borizing on close centers



IT PAYS TO COME TO HEALD!

® HEALD

THE HEALD MACHINE COMPANY

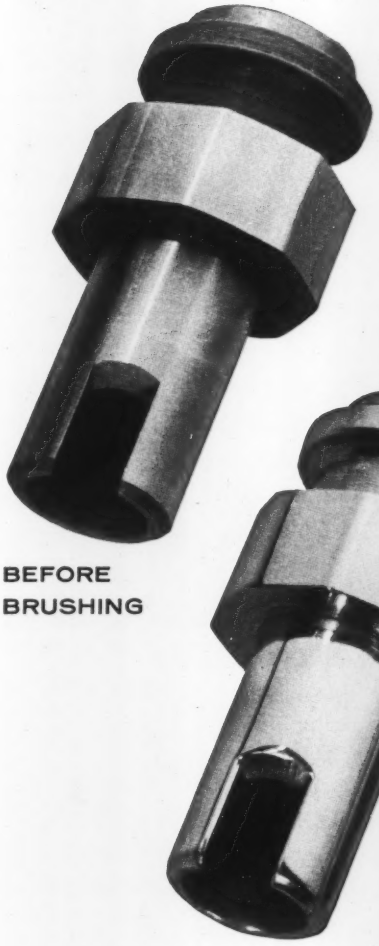
Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

OSBORN BRUSHING METHODS *worthy of your confidence*

6-second finish



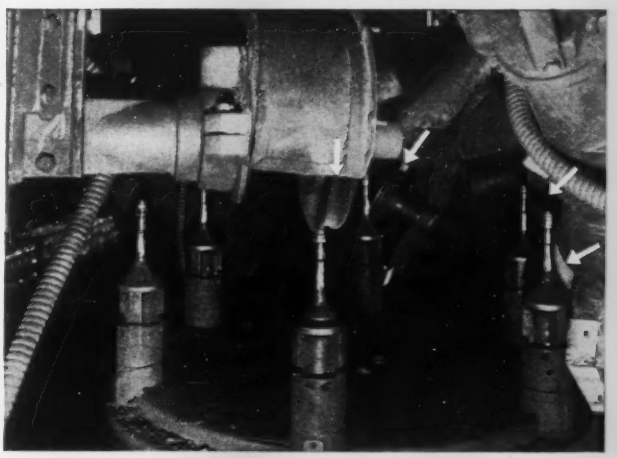
BEFORE BRUSHING

AFTER BRUSHING

THE efficient job performance demanded of these cylindrical steel cams requires the proper finishing of their many surfaces. Power brushing proved to be the most effective method for removing the sharp edges and small burrs.

In the operation shown below, Osborn Power Brushes mounted on an automatic rotary machine remove minute burrs and blend surface junctures. This is done on a 6-second cycle . . . quickly, accurately and economically.

An **O**sborn **B**rushing **A**nalysis, made in your plant at no obligation, may point the way for improvements in your operations. Write *The Osborn Manufacturing Company, Dept. G-56, Cleveland 14, Ohio.*



Four Osborn Monitor® Brushes remove burrs and produce accurately finished parts.

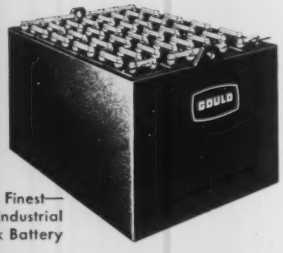
Write TODAY for the new 100-page Osborn Catalog 210-C

Osborn Brushes

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES • BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

Why worry about Batteries...

Specify **gould** and relax



America's Finest—
Gould Industrial
Truck Battery

Dependable battery performance day in, day out is worth more to you than any other single benefit. Right? That's why Gould has carefully perfected the design of Gould Batteries over long test years. Manufacturing techniques at Gould are also the result of patient development, so that today you are assured of maximum power, long life, and trouble-free operation with *every* Gould battery you buy. Ask for new booklet "...so you're going to buy an industrial battery." Write Gould-National Batteries, Inc., Trenton 7, N.J.

©1957 Gould-National Batteries, Inc.

Always Use Gould-National Automobile and Truck Batteries *More Power to you from Gould*

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WHEN THE BOTTOM DROPPED OUT of the ERIE CANAL

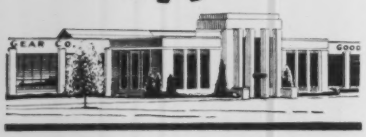
Of the many noteworthy events that took place back in 1907, one of the most unusual occurred near Syracuse New York, where a part of the bottom of the Erie Canal dropped out. Four canal boats were sucked through and shattered; a flour mill was badly damaged; and there was a loss of over $500,000. This catastrophe may sound more believable when we tell you that the break occurred on a viaduct over Onondaga Creek.

In a more constructive vein, a happier (if less publicized) event occurred in Cincinnati in the same year, when Soren Sorensen and John Christensen founded what was to become The Cincinnati Gear Company.

In the ensuing fifty years, many changes have taken place. People no longer ride on canal boats; and the gear-manufacturing business has progressed similarly. Technologically we've been in the forefront of this progress, but we've also tried to preserve some of the attention to detail and "craftsmanship" that prevailed in those earlier times. The result has been a gratifying record of customer satisfaction — the kind of satisfaction we'd like *you* to experience on your next custom gear order.

THE CINCINNATI GEAR CO.
CINCINNATI 27, OHIO
Fifty Years of "Gears—Good Gears Only"

CINTI ®



behind the scenes

Improved Marketing

The beetle-browed sales person in the tiger apron cleared his throat, producing a sound like a steam locomotive blowing its stack, hoisted his product for all to see, then lightly set her back on her feet.

"What am I offered for this doll?" he inquired, smiling archly at his shaggy neighbors. "She's real good at chewing mastodon skin; softens it up for shirts like nobody's business. Look at them fine yellow teeth; got 'em all except those front ones, too. Why, this woman washes all over every time there's a full moon. Do I hear any offers?"

"What's wrong with her?" somebody shouted.

"You got me wrong, friends," said beetle-brow. "This here is a real dish, but I already got more wives than I need. However, I'm short of ax heads, so I'm ready to make a deal, using the sharpest pencil in town."

Perhaps marketing began that way: Somebody had a commodity he wished to trade, and commerce was born. Today, marketing is a fantastic modern science, and STEEL examines its current trend in a Program for Management story beginning on page 93. Today's marketeer doesn't simply hoist his product for all to see, and shout his wares. Gracious, no. He causes goods and services to be moved through scientific planning, and if you want to learn something about modern marketing methods, turn to the article at once.

From Cams to Gams

We used to refer to STEEL's Detroit editor as foxy Don Postma, and recent evidence suggests that the handle fits. Know what that boy just went and done? He done acted as a judge at a beauty contest! The AC Spark Plug Division, General Motors Corp., Flint, Mich., cooked up a beauty contest, open to all women employees. In no time at all, 300 living dolls were nominated, which was slightly confusing, because the AC people just weren't aware that they had so much charm on their payroll. Six judges, representing the press, radio and TV, were called in to select half a dozen finalists—and that's where foxy Don entered the act. That rascal sat around during an all-afternoon session ogling the prettiest girls in the entire AC Spark Plug Division and had the nerve to report that it was all in the line of duty.

Book Sale

Miss Elsie Ihlenfeld, who runs the company library on the sixth floor, said she remembered that an old sailor named George once appeared in this column. "If he still reads this page," she went on brightly, "and has any friends, he and they will be happy to know that the 54th edition of the *Great Lakes Red Book* has just come off the press. It lists all the vessels of the Great Lakes, including the names of their owners, captains and engineers, plus shipbuilding and ship repair yards. It costs only a dollar and may be obtained from the Penton Book Department, 1213 W. 3rd St., Cleveland 13, O.

"Miss Ihlenfeld—is this by any chance a request for advertising space on this completely dedicated editorial page? Don't you realize that STEEL wouldn't dream of commercializing this column?"

"Your father's moustache," retorted our most efficient librarian. "Here's a spare copy for yourself. Spread the good news, won't you?"

We opened the book at random, and learned immediately that I. Isaakesen is the captain of the motor vessel *Svanefjell*, that it belongs to Olsen & Ugesltad, of Oslo, Norway, and that it has four hatches. Say, this is *fun!* Let's see: Here's the *Manhasset* barge . . .

Got a Match?

It's about time for another match stick equation, isn't it? Here's one that is wrong the way it stands, but you can change it into a true equation by altering the position of only one match:

| | + □ = |

Shrdlu

(Metalworking Outlook—Page 47)

B.F.Goodrich report:

Photo courtesy North American Coal Corp., Cleveland, Ohio

Hose swallows needle-sharp slivers of coal

B. F. Goodrich improvements in rubber brought extra savings

Problem: At this mine, coal is put through a huge washing machine that shakes rock and sand out of the coal, much like a home washer shakes dirt out of clothes.

The water—8000 gallons of it a minute—used to be circulated in and out of the coal washer by steel pipes. But the water is loaded with tiny particles of coal—hard and sharp, like needles—that wore holes right through the steel. Welders worked every weekend, patching holes. The pipe was being replaced every year.

What was done: When a B.F.Goodrich distributor heard about the trouble, he suggested a rubber hose developed by B.F.Goodrich for handling rough materials. It is made with a special lining of the toughest wear-resisting rubber known. This rubber is so tough that, on many jobs, it outlasts the hardest steel 10 to 1.

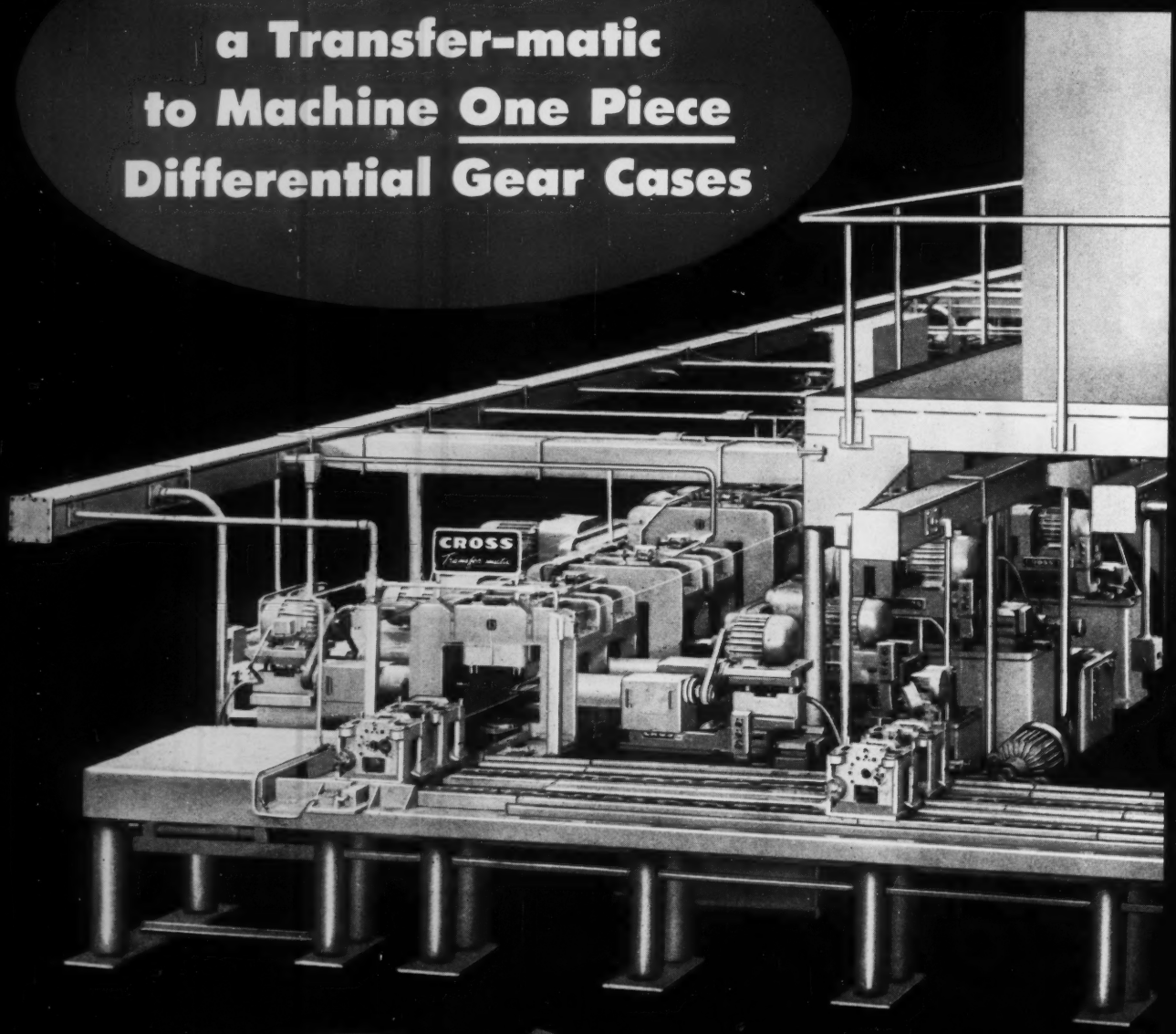
Savings: The B.F.Goodrich rubber hose was tried. You see one big length of it at right in the picture. It has been on the job over 4 years now, and is still in excellent condition. No holes, no repairs, no problems of any kind.

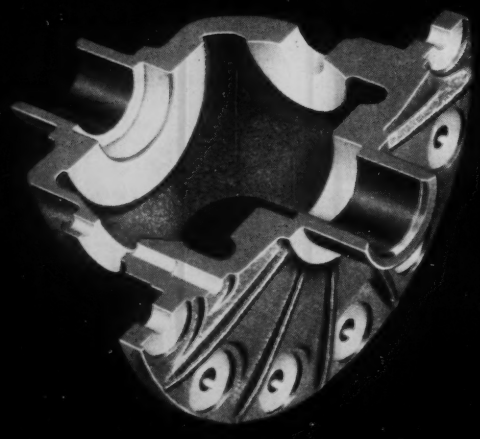
Where to buy: Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich hose described here. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-989, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Another Cross First – a Transfer-matic to Machine One Piece Differential Gear Cases





Cutaway view of differential gear case showing machined surfaces.

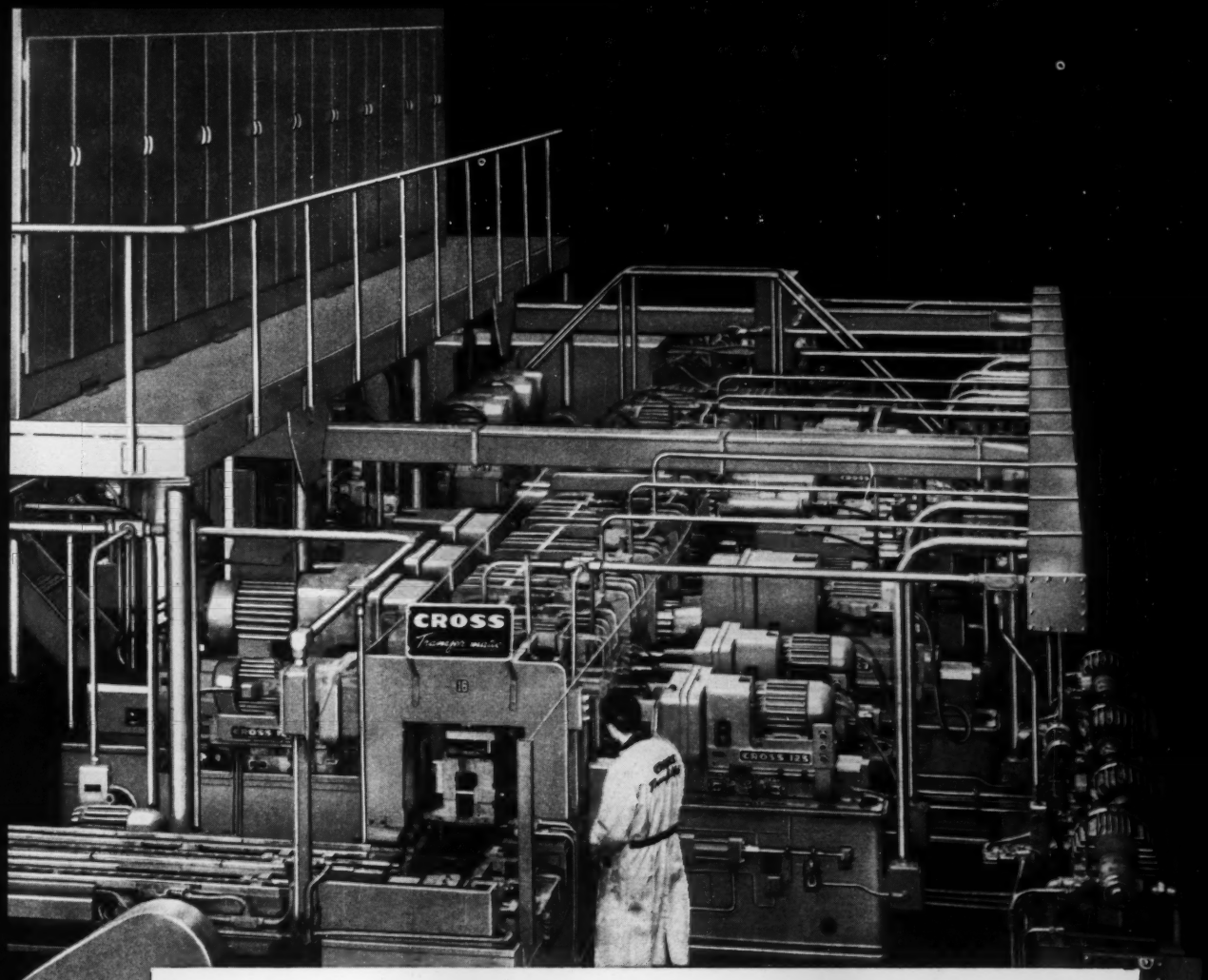
Established 1898

THE CROSS CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN

Another Transfer-matic by Cross



Here is another revolutionary development by Cross! A new Transfer-matic makes it possible to machine and inspect *one piece* rear axle differential gear cases—the first time such a part has been processed on a transfer machine.

Two cases are machined at a time as they travel a distance of 206 feet through 30 stations. Rated capacity is 212 pieces per hour at 100% efficiency. Operations include rough and finish forming the two spherical seats for the pinions; rough and finish boring and facing the two seats for the side gears; drilling, boring and reaming the pinion shaft hole; drilling and reaming the lock pin hole; drilling, chamfering, spotfacing and reaming the twelve ring gear mounting holes.

A unique feature is the arrangement for locating and clamping the pallet fixtures. In each station, elevators lift the fixtures from transfer bars into engagement with locating pins and stop buttons fixed in the overhead bridge structures. Individual wedges then back up the elevators to secure the pallets. After cutting, the elevators lower the pallets onto the transfer bars, which carry them to the next station.

Other features include construction to JIC Standards, hardened and ground ways, complete interchangeability of all standard and special parts, pre-set cutting tools and Cross Machine Control Units which program tool changes to reduce machine downtime.

Stop Oil Bath Air Filter Fires Fast!

Custom-engineered for extra-dangerous hazards like spray booths, dip tanks and electrical equipment, the Kidde automatic carbon dioxide extinguishing system gives you the fastest, safest 'round-the-clock fire protection ever made! All operating parts completely enclosed for safety. No falling weights, no clumsy mechanical triggering methods. Self-contained, no outside power needed. Visual indicators to show if system is set or released. Easy testing of all operating parts. No parts to replace after operation or test. Clean, non-electrical conducting carbon dioxide gas snuffs fire out in seconds, vanishes into thin air. Leaves no mess, won't harm machinery. Write for Kidde's automatic carbon dioxide fire extinguishing systems booklet today.

Kidde

Walter Kidde & Company, Inc.
660 Main St., Belleville 9, N. J.

Walter Kidde & Company of Canada Ltd., Montreal — Toronto

LETTERS
TO THE EDITORS

Appreciates Extra Reprints

May I have a copy of the article, "How To Choose Heat Tolerant Coatings" (Apr. 22, page 82)?

I appreciate your service of furnishing extra copies of key articles. It is no longer necessary to choose between mutilated copies of STEEL and a complete technical file.

J. Z. Briggs
Director-Technical Information
Climax Molybdenum Co.
New York

Titanium Report Sought

I would like to have a copy of the article, "Titanium Forming—2.5 Million Lb of Experience" (May 20, page 178). I am working in manufacturing research, and I feel it will be of great benefit.

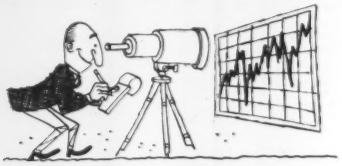
Sterling Nowka
Engineer
Manufacturing Research & Development
Bell Aircraft Corp.
Buffalo

Testing Design by Vibration

I have just finished reading an interesting article, "Vibration Tests" (May 20, page 168). I would like a copy.

James K. S. Ruby
Vice President & Secretary
Pittsburgh Testing Laboratory
Pittsburgh

Looking for Ups and Downs



We have only recently established formalized marketing research at both the corporate and divisional levels and are attempting to find indexes which may give us implications of lead and lag factors.

For the last six months, I have been watching your industrial production index in the Business Trend column and would like to plot this back to 1947-1949. Would you furnish me the series?

Reginald C. Morrell
Market Research Manager
Associated Spring Corp.
Bristol, Conn.

• STEEL's *industrial production index was put on the 1947-1949 basis in mid-1954. The index was worked back through 1953 on the new bench mark. We are glad to forward a week-by-week tabulation of the index from 1953 to date.*

Market Research Problem

What you say in your May 6 editorial, "You Need Market Research" (page 49), is true if big companies only are meant.

We handle mostly small accounts. We have tried to use big research houses, but our accounts could never pay the price. Sometimes the bale of figures these professional researchers come up with cannot be translated into anything useful without adding greatly to the present cost of operating the business.

With our clients, we have found that

(Please turn to page 12)

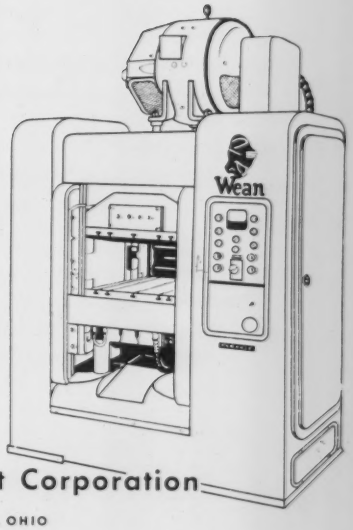
Production up almost 300% on compound pierce-and-blank operation

Production Rate: **Conventional press — 90 pieces a minute**
Wean "Flying Press" — 335 pieces a minute

The piece illustrated above is a circuit breaker cradle stamped out of .064 gauge strip steel. Length of index was 1¼". Involving a compound pierce-and-blank operation, it was produced on a conventional press at the rate of 90 parts per minute at the Westinghouse plant in Beaver, Pennsylvania. Using the same dies in a 60-20-36 "Flying Press", Westinghouse increased production to 335 parts per minute.

Speed, however, is only one phase of the "Flying Press" story. Automatic operation, centrally located controls, greatly reduced maintenance — all combine to make this the most remarkable press development since the turn of the century.

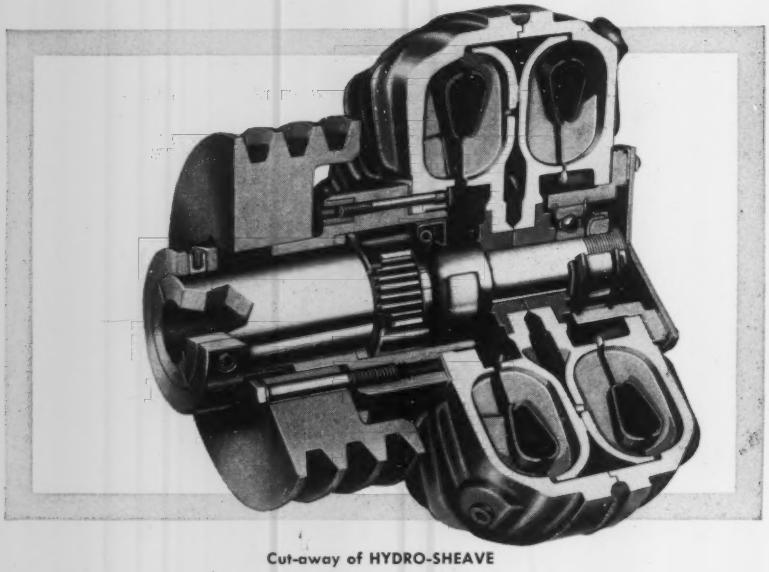
The whole story is covered in detail in the Wean "Flying Press" Brochure. Write for it today.



Wean Equipment Corporation
CLEVELAND 17, OHIO

BLANKING | PROGRESSIVE BLANKING | COMPOUND PIERCE-and-BLANK | PROGRESSIVE DRAWING | PROGRESSIVE FORMING

Here's why machinery lasts longer *WHEN POWERED THROUGH FLUID*



Cut-away of HYDRO-SHEAVE

Wherever you find shock loads, torsional stresses or vibrations, you can bet both driving and driven equipment will show undue wear.

That is, *unless the power is transmitted through fluid!*

With Twin Disc Fluid Couplings and HYDRO-SHEAVE® Drives, there are no mechanical connections between driving and driven equipment . . . no metal-to-metal contact to transmit destructive shocks and vibrations. These, instead, are absorbed in the fluid—not in your machinery's expensive components.

But that's not all. Twin Disc Fluid Couplings and HYDRO-SHEAVE Drives offer such advantages as—

1. **Reduce motor starting current demands . . . provide smooth, fast acceleration . . . and often improve over-all power factor.**
2. **Protect against overloads, stalling and motor burn-outs.**
3. **Transmit full input torque at all output speeds.**
4. **Permit motor selection based on running rather than starting load.**
5. **Are engineered as a "package" . . . can be installed in minutes on any standard keyed shaft.**
6. **Because of fluid connection, *cannot* wedge or "freeze" internally.**

Twin Disc HYDRO-SHEAVE Drives—¾ to 50 horsepower; Fluid Couplings—¾ to 850 horsepower.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC

Friction Clutches and Fluid Drives

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

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LETTERS

(Concluded from page 10)

to locate a market, its size, competition, etc., you can depend solely on a modest advertising campaign for your findings. It usually costs less than when you precede it with a professional investigation, in which case you still have to buy the advertising.

I wish there were such a thing as a "small" market investigation.

Claude Schaffner
Claude Schaffner Advertising Agency
New Haven, Conn.

Facts About Copper

Your article, "More Colors for Copper" (May 13, page 141) was interesting and instructive. We would appreciate a copy for reference use in research on one of our products.

J. Paul Ahlbrandt
Plant Manager
Clark Grave Vault Co.
Columbus, O.

Series Stimulates Thought

Congratulations are in order for your excellent 1957 Program for Management. Each article of the series has broadened my perspective and stimulated deeper thought on basic management problems. I would appreciate copies of all the published articles in this year's series.

Richard De Luca
Departmental Procedures Co-ordinator
Manufacturing Engineering Department
Wright Aeronautical Division
Curtiss-Wright Corp.
Wood-Ridge, N. J.

Faces Titanium Problems

We have used titanium on several occasions and ran into several problems. Your article, "Titanium Fabrication from A to Z" (Apr. 22, page 94), proved to be of great interest. Please send a reprint.

A. A. Szakaly
Supervisor
Tube Development Shop
Tube Division
Radio Corporation of America
Marion, Ind.

Process for Metal Remover

Please send four copies of the article, "Contouring with Chemicals" (June 3, page 85). These are urgently required for immediate consideration.

E. C. Williams
President
Airserco Mfg. Co.
Pittsburgh

Timely Management Report

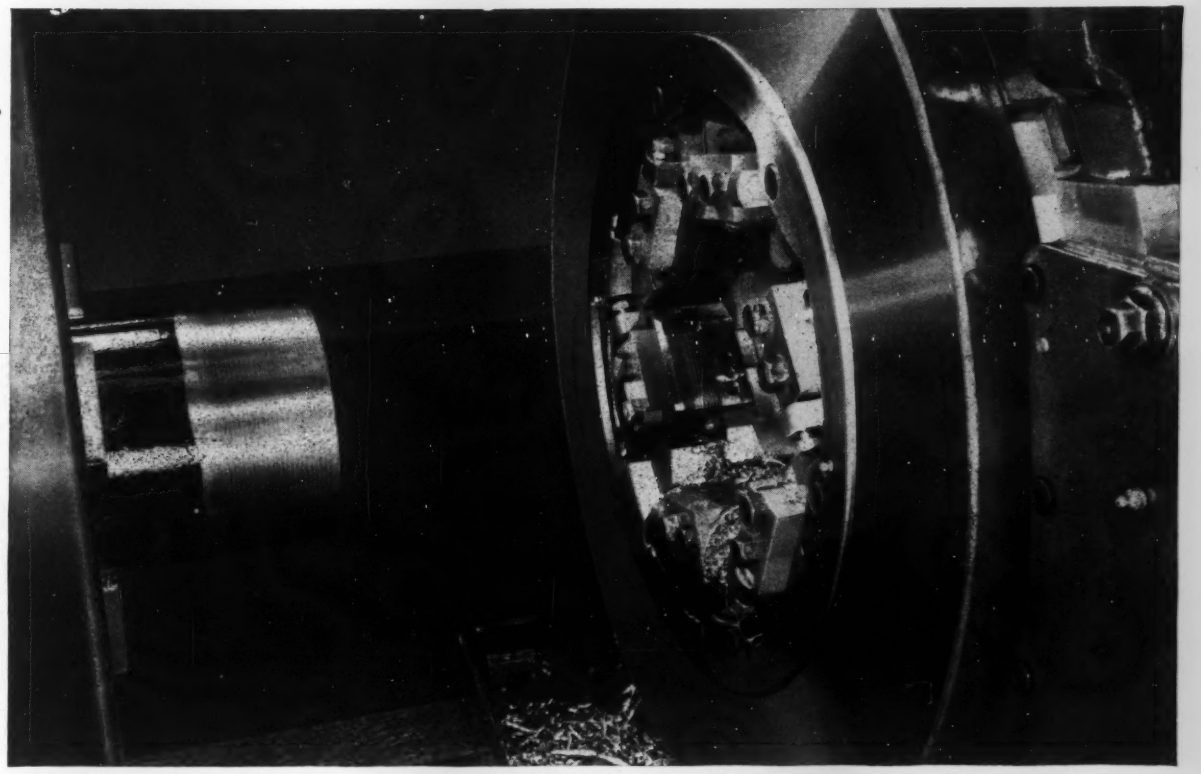
Your 1957 Program for Management article, "Inventory Management" (May 13, page 109), is excellent and timely for many companies. Kindly mail one copy.

C. G. Stortz
Order Department
Atlas Steels Ltd.
Welland, Ont.

Article To Be Training Aid

I read with much interest your article, "Atmosphere Control" Part I (May 20, page 138) and Part II (May 27, page 96). Please send a copy for the training of our metallurgists and reference.

P. D. Ohrman
Vandergrift Plant of Irvin Works
United States Steel Co.
Vandergrift, Pa.



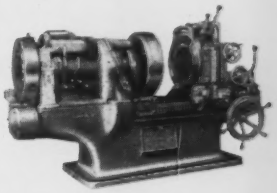
LARGE TEXAS SHOP USES LANDIS PIPE MACHINES *Exclusively . . . .*

TEN LANDIS Receding Chaser Pipe Threading Machines are used by Atlas Pipe, Inc., largest mill-type pipe finishers on the Gulf Coast, for threading oil tubular goods.

These machines are installed in an offset position so as to permit uninterrupted production. Typical production figures show: the 4¾" machines threading 74 joints (148 threads) per hour from 2⅜" upset tubing—the 8⅝" machines averaging 20 joints (40 threads) per hour from 5½" casing. All threads are 8 pitch to API standards.

Mr. Becker, Plant Manager, highlights the important production advantages of LANDIS Pipe Machines when he says that they were selected for their flexibility, versatility, and the uniform threads produced. Thread uniformity is made possible by massive construction, leadscrew control of the carriage movement, a precision-built die head featuring LANDIS Tangential Chasers, and an attachment which mechanically controls the degree of taper.

These machines offer flexibility through wide range coverage—three sizes of machines (4¾", 8⅝", 13⅜") thread all pipe sizes from 1⅝" to 13⅜". Ease of set-up is also important — a change of diameter and length in less than two minutes, a complete change for diameter, pitch, taper, and length in 40 minutes.



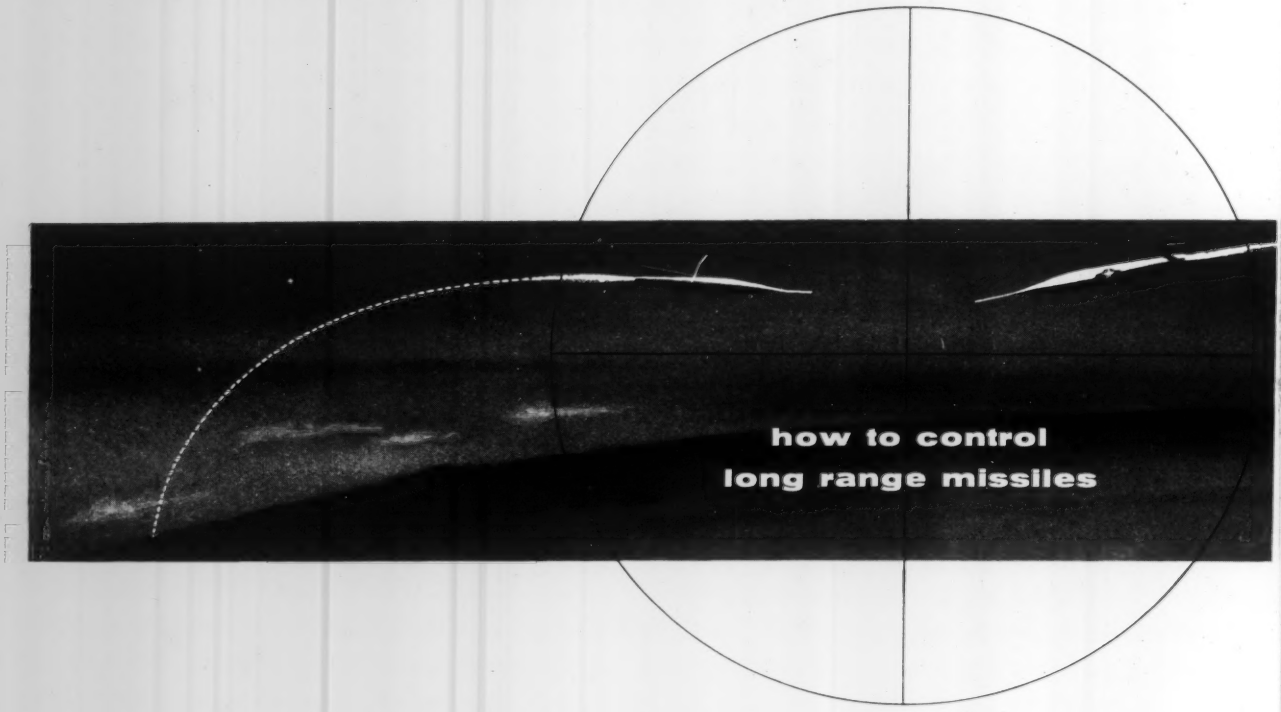
LANDIS Receding Pipe Machines perform four other pipe fabricating operations in addition to threading: cutting off, chamfering, reaming, and the making and breaking of collars. For more information, write for Bulletin C-77.

378

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

THE WORLD'S LARGEST MANUFACTURERS OF THREAD GENERATING EQUIPMENT

a new concept in gear accuracy!



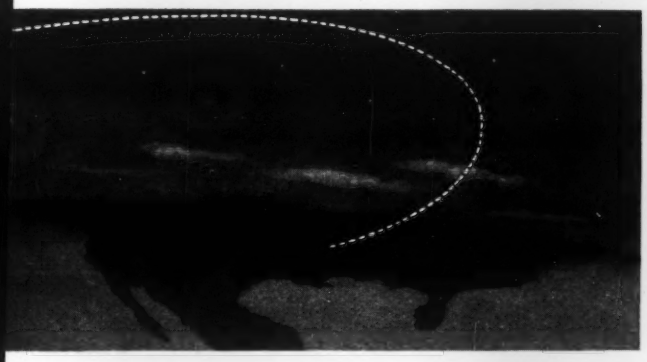
The control systems of modern missiles and aircraft are the "brains" which guide them to the target. Higher speeds, longer ranges and increased altitudes necessitate much more accurate control systems than in the past. One key to greater accuracy is gears made to previously unobtainable tolerances — gears which have an effective angular error of transmission of no more than ten seconds. And since speeds and ranges are increasing almost daily, the trend is toward closer and closer tolerances.

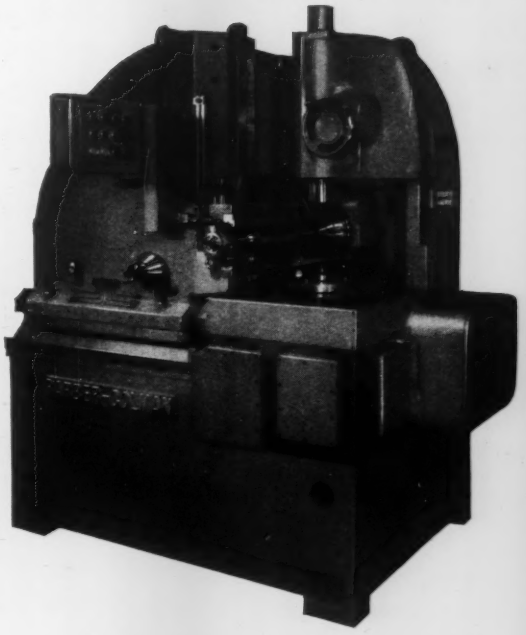
Barber-Colman engineers, working closely with Sperry Gyroscope engineers, have developed a machine and hobs which cut gears to closer tolerances than ever before produced. This machine is known as the "Ultracision" hobbing machine, and it cuts gears which will transmit uniform motion within ten seconds of arc or less, on a gear of 4″ diameter. This machine is now hobbing gears *on a production basis* in the Sperry plant.

What does an error of ten seconds mean? It means that a plane flying 5000 miles would be within 400 yards of target at destination if dependent on gear accuracy alone in the navigation system. Five years ago, a one-mile error was good enough, but it is not today. More accurate gears are a primary requirement for these precision controls.

We have been asked to compare ten seconds of angular error to a given amount of total composite error. Such a comparison is not practical because they involve two entirely different methods of inspection. Theoretically, one function of a gear is to transmit uniform angular rotation within the required limits of accuracy. Therefore, the measurement of angular error provides a direct method for determining the rotational accuracy of the gear. Total composite error is the amount of center distance variation obtained by rolling a gear with a master gear or rack. This method provides a relative measure of gear accuracy.

In trying to obtain the very finest gears, Sperry engineers have developed a method of inspecting angular errors with fantastic accuracy. They can now measure angular error between any corresponding points on gear teeth profiles to an accuracy of one-half second of arc. This method measures the effect of spacing, lead and profile errors. Presently allowable errors cannot exceed ten seconds of true angular displacement at any diameter along the involute.





One of the most important features of the "Ultracision" hobbing machine is the accuracy of the relative rotation between the work spindle and the hob spindle. This is probably the most important single feature affecting accuracy of gears produced. This relative rotation was inspected dynamically by means of a theodolite and a camera. All other machine elements were made to extremely small tolerances, resulting in hobbed gears within the required tolerance of ten seconds.

Original hobs for this machine were made to one-half the tolerances of Class AA hobs. However, tests showed that hobs made to Barber-Colman Class AA tolerances were accurate enough for this application, and they are now being used on this machine. Although Class AA tolerances are used, the hobs are really more accurate than these tolerances would indicate because the diameter is over twice the diameter of a standard hob of an equivalent pitch.

Since Barber-Colman engineers have designed and built the hobbing machine which cuts the world's most accurate gears, they have the experience to recommend the machine to produce gears to your accuracy requirements. In most cases, standard-type machines will satisfy your requirements. On our most accurate standard-type machine, we guarantee that it will hob a 4″ PD, spur gear within .0002″ adjacent and .0004″ non-adjacent spacing error.

We invite you to submit your gear specifications and problems for analysis and recommendation by our engineers.

For more information about the "Ultracision" hobbing machine, write for descriptive literature.

BARBER-COLMAN COMPANY

636 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines

BARBER COLMAN

KNOW Mississippi

We cordially invite you to read this important message from Mississippi's Governor J. P. Coleman.

Metal working plants can prosper in Mississippi . . .

There's a good climate for industrial growth down in Mississippi. Under our State's famed BAWI program we can finance your new metal working plant in a community of your own choosing, and grant you tax exemptions of five to ten years.

Every effort is made by the Governor, the Legislature and all responsible State officials to operate our State government on such a high plane of service, stability and economy as to leave no doubt in the minds of industrialists of the nation that Mississippi is a sound, safe and outstanding place in which to locate and operate —a place where they will receive fair and equitable treatment under sane and just laws.

Mississippi offers industrial enterprises the happy combination for a profitable plant operation — proximity to *markets*, a wealth of *materials*, and an adequate reservoir of *manpower*.

Would you like to know Mississippi's potential for your new plant? Please write me for the facts you need. We want you to know Mississippi.

J. P. Coleman
GOVERNOR OF MISSISSIPPI

Mississippi Agricultural & Industrial Board
STATE OFFICE BUILDING
JACKSON, MISSISSIPPI

THE BAWI STATE

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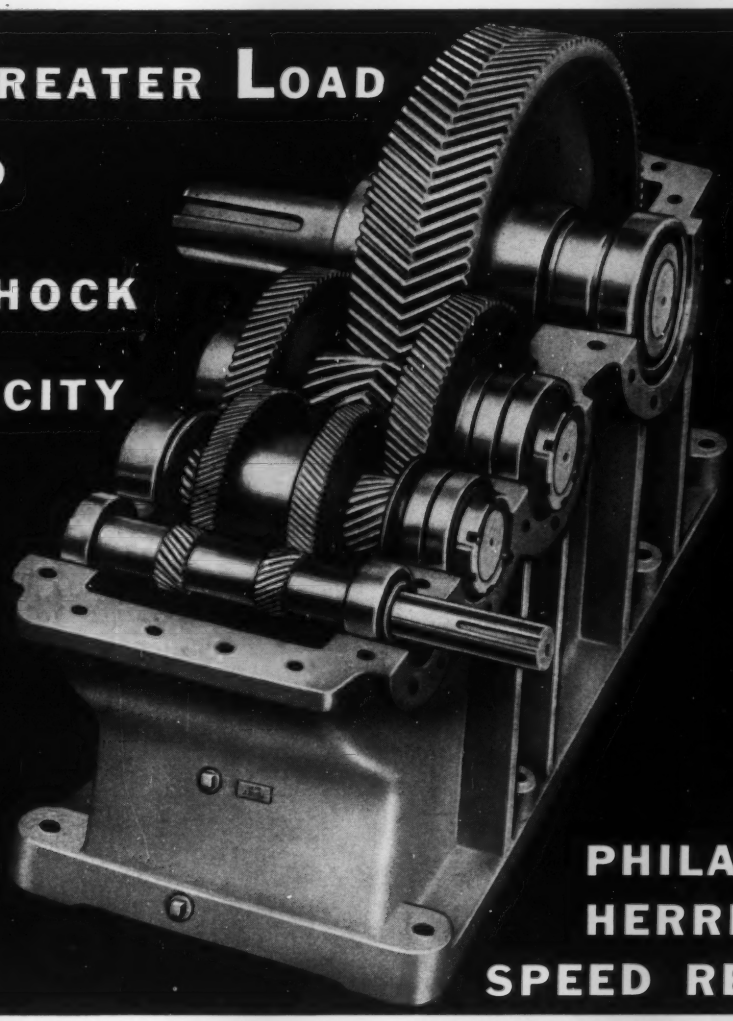

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. . . PAY OFF IN HIGH EFFICIENCY GREATER STRENGTH, LONGER LIFE

Where you have a machine drive that requires high horsepower speed reduction under grueling load and shock conditions, specify Philadelphia Continuous Tooth Herringbone Speed Reducers . . . Built to withstand the most severe round-the-clock operation, these Reducers offer you extra service dividends through high efficiency, greater strength, and years of quiet, trouble-free operation.

Herringbone and Helical Gear teeth are precision cut for maximum tooth contact and overlap . . . assure uniformity of torque and freedom from damaging vibration.

Gears and Pinions are arranged symmetrically within rugged, compact housings, which assures equal loads on each shaft bearing, and minimizes the most severe stresses. Fully enclosed, self-contained housings prevent oil leakage . . . no parts such as glands require adjustment . . . more than ample oil reservoir assures cool correct lubrication. Available in single, double and triple reductions covering a range of ratios from 1.75:1 up to 292:1, Philadelphia Herringbone Reducers provide optimum performance at minimum cost.

Send for new 48-page catalog . . . contains complete design and application data on these widely used, highly efficient units.

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INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS
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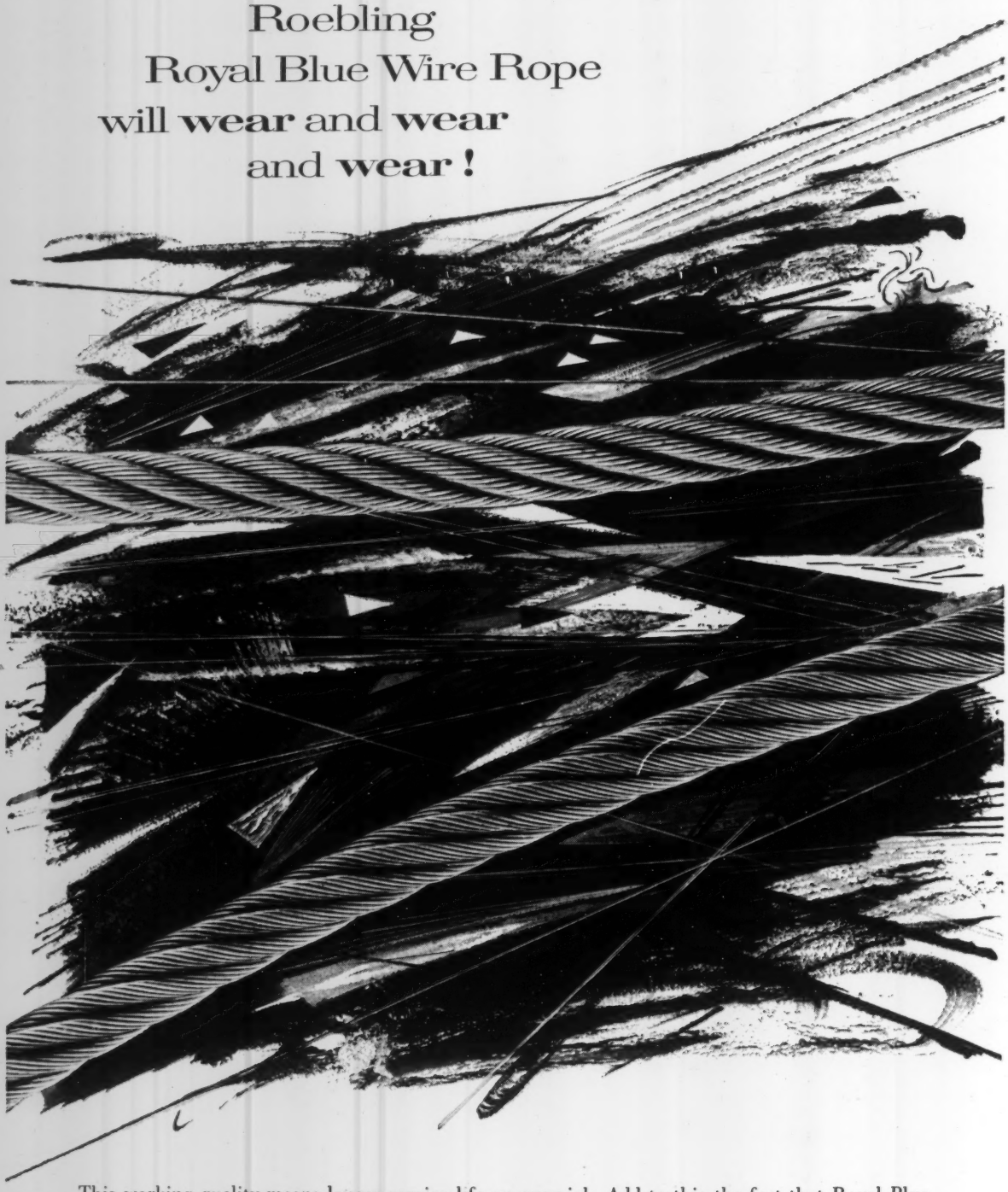
Roebling Royal Blue Wire Rope will **wear** and **wear** and **wear**!



This working quality means longer service life on *your* job. Add to this the fact that Royal Blue is stronger than the strongest rope you have been using and you have two excellent reasons why it has enjoyed faster acceptance than any wire rope in Roebling's history. Your distributor or Roebling Sales Office will give you the complete story, or contact John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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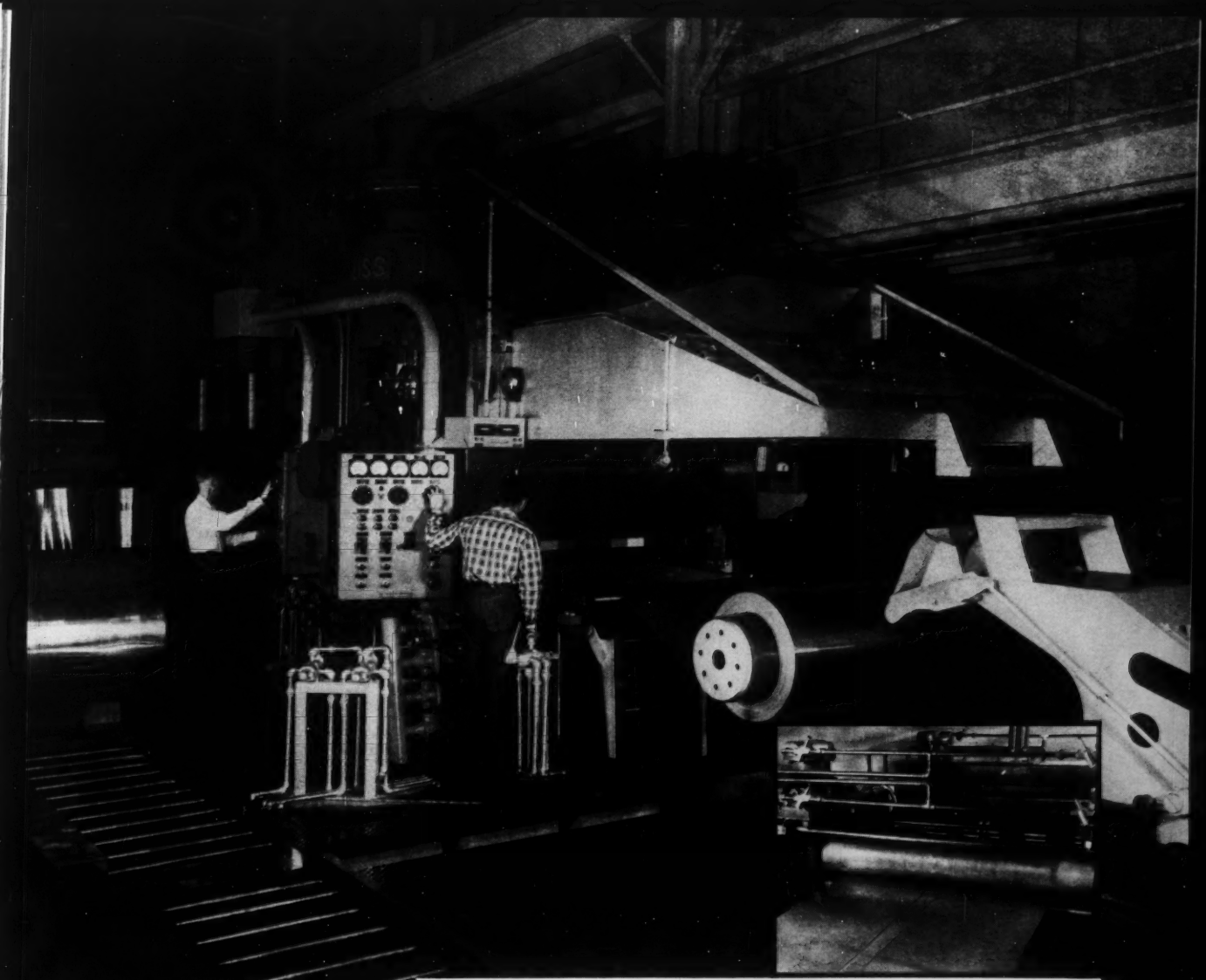


New Bliss 4-high 12" and 36" x 62" cold mill rolls strip in gages from 0.125" to .004" and up to 56" wide at 1500 fpm. Back-up rolls are Mack-Hemp "Technalloy".

New Bliss combination slitting and shearing line can take 5 cuts in 0.125" material 56" wide at 200/600 fpm . . . any length from 2 to 17 feet.

How to double rolling capacity—*FAST*

What can one new mill do? In the case of Sheet Aluminum Corporation, the answer is *plenty*. Here's what a new Bliss 4-high cold mill has done for this Jackson, Michigan, subsidiary of Mueller Brass Company:

- **More than doubled potential capacity,** from approximately 10,000,000 pounds of aluminum sheet and strip a year, to 25,000,000 pounds.
- **Increased the limit** on strip width from 24" to 56".
- **Simplified handling** by making it possible to roll much larger coils.

Of course, Sheet Aluminum had to make other installations to take full advantage of the new mill's capacity: a new continuous annealing furnace, a new Bliss slitting and shearing line, completely automatic coil handling equipment. But the fact remains that it's the mill that will do the heavy work.

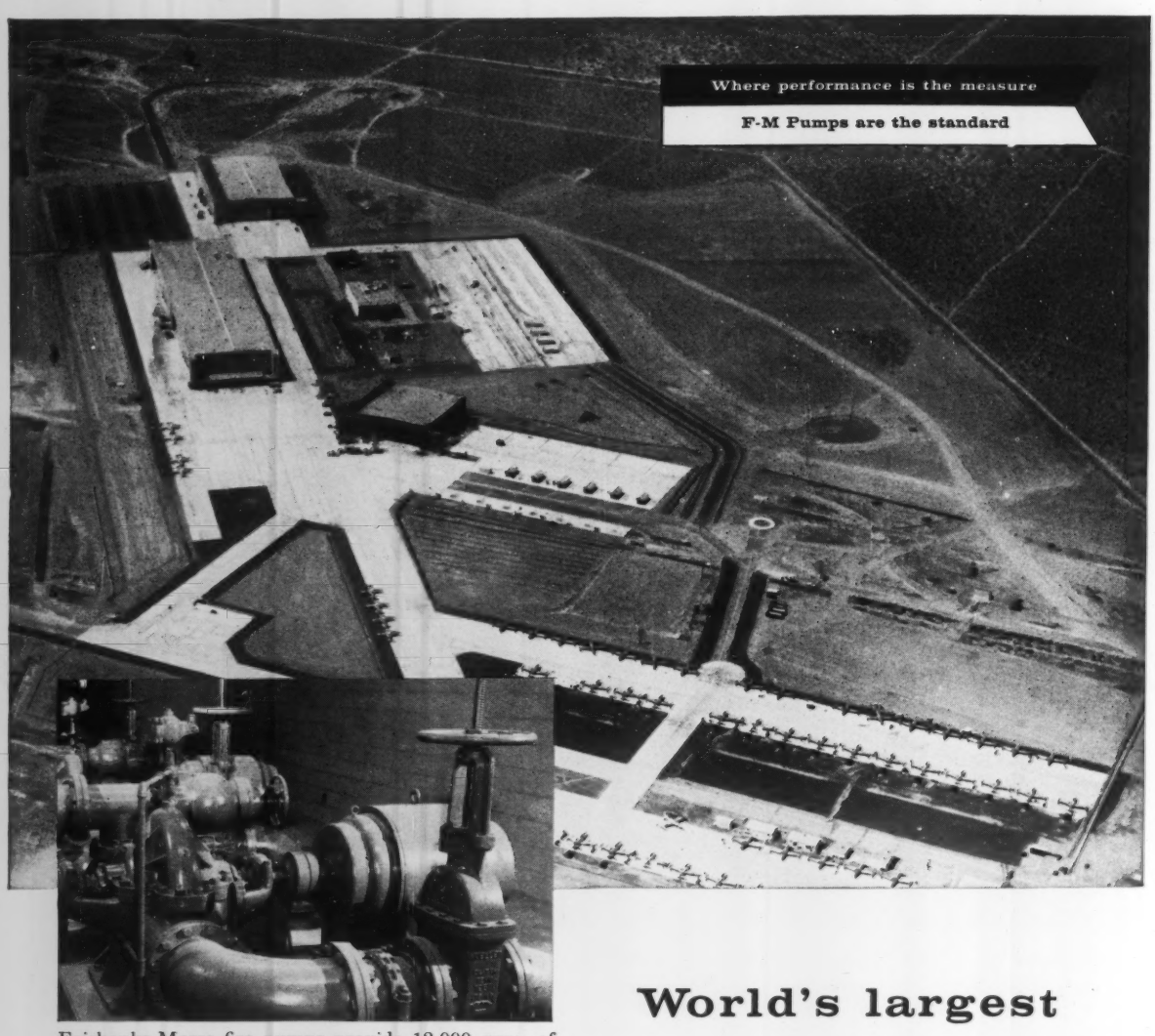
Bliss' Rolling Mill Division engineers are expert in designing equipment that squeezes top production out of dollars invested. For other examples of their work, why not write today for your free copy of the 64-page Bliss Rolling Mill Brochure, Bulletin 40-A?

BLISS
SINCE 1857

100 years of making metal work for mankind

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio



Fairbanks-Morse fire pumps provide 12,000 gpm. of water at 100 psi. for each of two systems.

World's largest jet aircraft center protected by F-M fire pumps

Four major aircraft companies—Lockheed, North American, Convair and Northrop—use the 5000-acre U. S. Air Force Plant No. 52 at Palmdale, Calif., for assembly and testing.

Maximum protection against fire at this gigantic operation was achieved at minimum cost by installing two identical, interlocking water supply systems, each equipped with Fairbanks-Morse pumps for both water supply and sprinkler pressure.

The size and scope of this installation indicate Fairbanks-Morse's ability to supply fire pumps for all magnitudes of industrial and municipal requirements. Whatever your needs in fire protection—big installations or small—your Fairbanks-Morse Field Engineer will be glad to work with your own engineers, in specifying the most efficient equipment. Call him today, or write Fairbanks, Morse & Co., Dept. S-6-17, 600 So. Michigan Ave., Chicago 5, Ill.

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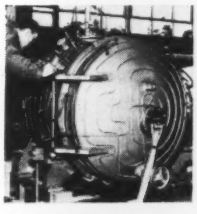
PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

design with austenal in mind

In aircraft, in vehicles, in the plant—
use turbine wheels made by Austenal **microcast**

Wherever you use power wheels — for supersonic jet engines, diesel engines, compressors or turbochargers — Austenal will make them faster, better and more economically. Wheels manufactured by Microcast are inherently of higher quality, more durable and more efficient than those made by other processes. Tolerances are exact — you have the wheel you need, flawless internally and externally, in virtually any size or configuration, many times with intricate design details unattainable by any other method. Think *Austenal* when you need turbine wheels. Demand the high quality and faultless performance Austenal assures manufacturers in all types of industry.

... *It's* **NEW** *from Austenal*



Austenal has developed a vacuum melting method for the high-temperature field to cast alloys not previously available. Write for full details.

Write today for Austenal's latest booklet, "Design with Microcast in Mind."

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Your automated production line will be made more efficient by using Eaton-Reliance Springtites and Sems for assemblies. Preassembly of screws and washers eliminate expensive hand operations — thus speeding production. In addition, the freely rotating, nonremovable washer exerts constant reactive pressure to keep bolted assemblies tight.

These time-tested fasteners will save production time, simplify inventory problems and reduce waste through loss.

Eaton-Reliance Springtites and Sems are being used to advantage on fast moving production lines in the automotive, appliance, farm machinery, and road building equipment industries . . . just about any place where speed, efficiency and quality spell p-r-o-f-i-t-s. Write for your free copy of Engineering Bulletin S-49, or ask for a visit from one of our fastening engineers.

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CALENDAR
OF MEETINGS

June 18-20, Triple Industrial Supply Convention: Mark Hopkins hotel, San Francisco. Information: W. B. Thomas, 2130 Keith Bldg., Cleveland 15, O.

June 19-21, American Marketing Association: Annual meeting and exhibit, Hotel Statler, Detroit. Association's address: 27 E. Monroe St., Chicago, Ill. Executive director: William C. Gordon Jr.

June 19-22, Drop Forging Association: Annual meeting, Grand hotel, Mackinac Island, Mich. Association's address: 419 S. Walnut St., Lansing 33, Mich. Secretary-treasurer: Richard Marcus.

June 20-23, American Coal Sales Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1625 Eye St. N.W., Washington 6, D. C. Executive vice president: W. W. Bayfield.

June 23-25, Alloy Casting Institute: Annual meeting, Homestead, Hot Springs, Va. Institute's address: 32 Third Ave., Mineola, N. Y. Executive vice president: E. A. Schoefer.

June 23-28, National Association of Power Engineers Inc.: Annual meeting and exhibit, Pantlind hotel, Grand Rapids, Mich. Association's address: 176 W. Adams St., Chicago 3, Ill. Secretary: Edward J. Schuetz.

June 24-25, Wire Reinforcement Institute Inc.: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 1049 National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

June 24-28, American Institute of Electrical Engineers: Summer general meeting, Sheraton-Mt. Royal hotel, Montreal, Que. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

June 24-29, Concrete Reinforcing Steel Institute: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 38 S. Dearborn St., Chicago 3, Ill. Managing director: H. C. Delzell.

June 27-28, Refractories Institute: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

July 6-9, Automotive Engine Rebuilders Association: Summer meeting, Royal York hotel, Toronto, Ont. Association's address: 419 N. Capitol Ave., Indianapolis 4, Ind. Executive vice president: R. G. Patterson.

July 16-17, Truck-Trailer Manufacturers Association: Summer meeting, Homestead, Hot Springs, Va. Association's address: 710 Albee Bldg., Washington 5, D. C. Secretary: John B. Hulse.

July 24-27, National Tool & Die Manufacturers Association: Summer meeting, Grove Park Inn, Asheville, N. C. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

Aug. 12-15, Society of Automotive Engineers: West coast meeting, Olympic hotel, Seattle. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

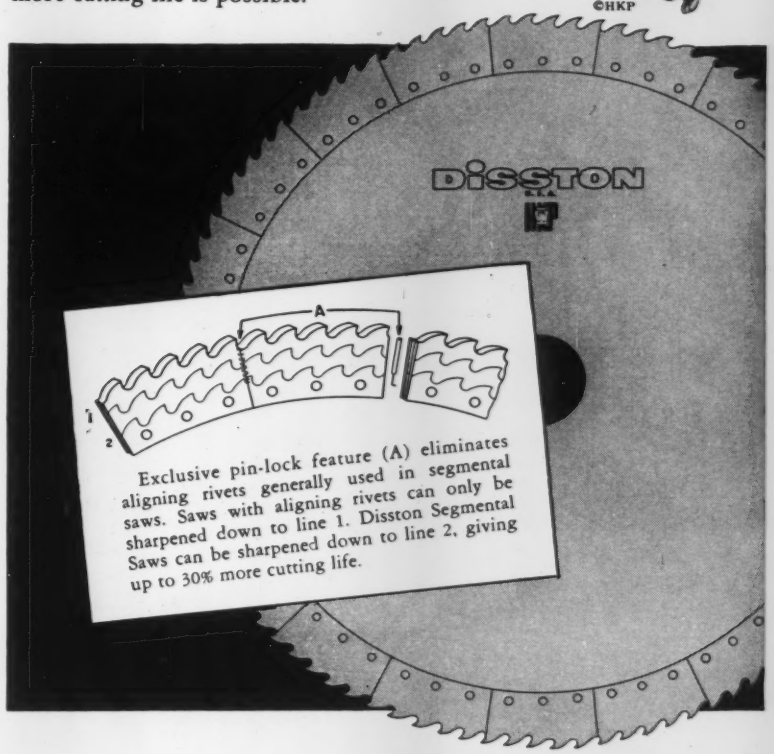
Aug. 20-23, Western Electronic Show & Convention: Cow Palace, San Francisco. Information: WESCON, 342 N. LaBrea, Los Angeles 36, Calif.

Aug. 28-30, American Institute of Electrical Engineers: Pacific general meeting, Chinook hotel, Yakima, Wash. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Increase cutting life up to 30%...with

DISSTON SEGMENTAL CIRCULAR SAWS!

Exclusive pin-lock feature *locks* segments together by aligning pins—permanently holding the segments in perfect alignment. Since there are no aligning rivets to limit sharpening, up to 30% more cutting life is possible.



Exclusive pin-lock feature (A) eliminates aligning rivets generally used in segmental saws. Saws with aligning rivets can only be sharpened down to line 1. Disston Segmental Saws can be sharpened down to line 2, giving up to 30% more cutting life.

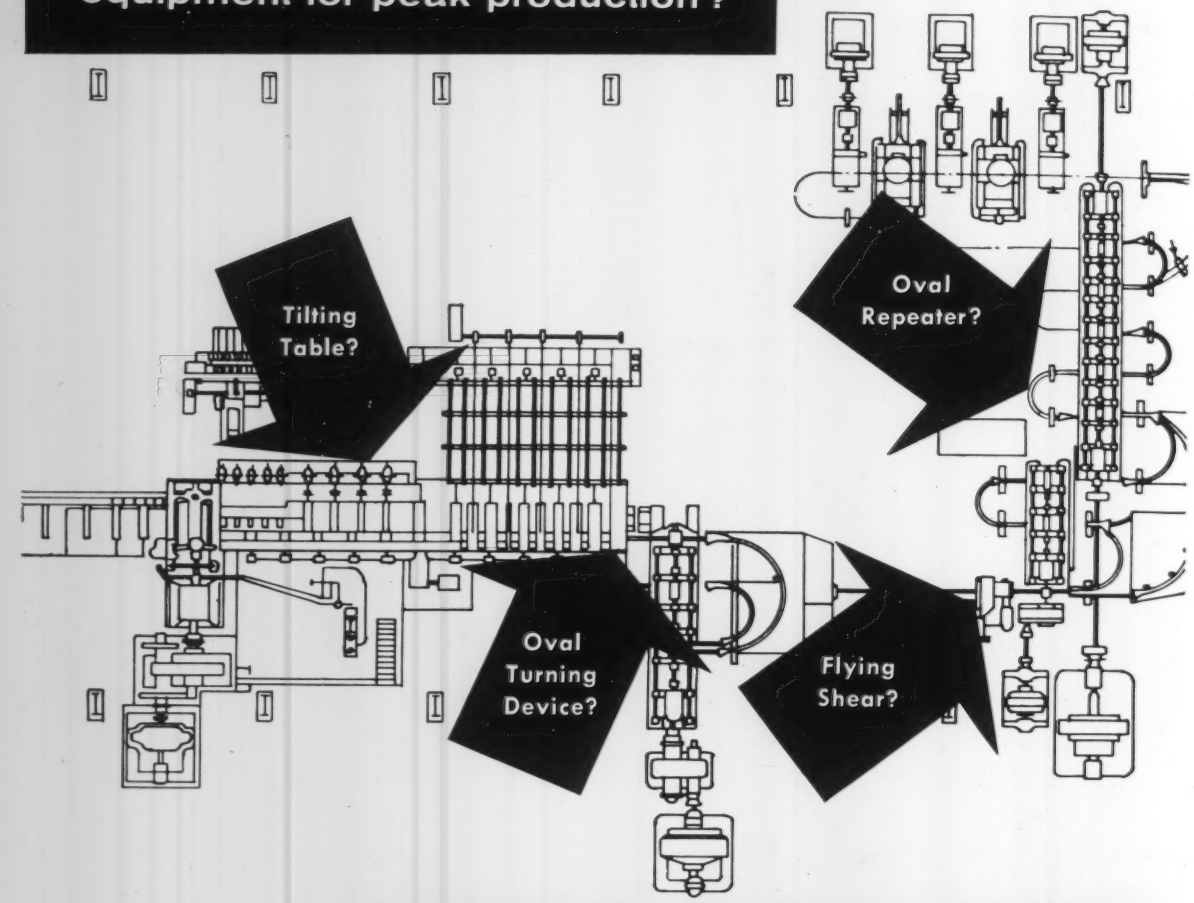
- **Replaceable high-speed steel segments need only infrequent sharpening.**
- **Narrow kerf assures fast, clean cutting with minimum waste.**
- **Teeth are accurately indexed so they may be sharpened on automatic machines.**
- **For cutting ferrous or non-ferrous metals.**
- **In diameters from 11″ to 63″.**

For cutting non-ferrous metals and plastics Disston also manufactures a complete line of solid tooth Diss-croloy and Alloy Circular Saws.

For new literature write to Disston-HKP, Philadelphia 35, Pa.

HKP Henry DISSTON DIVISION
H. K. PORTER COMPANY, INC.

What station in your mill needs specially designed equipment for peak production?



From auxiliary units to complete mills, look to BIRDSBORO for new ideas in design and production

DESIGNERS AND BUILDERS OF:

- STEEL MILL MACHINERY
- HYDRAULIC PRESSES *(Metalworking and Extrusion)*
- CRUSHING MACHINERY
- SPECIAL MACHINERY
- STEEL CASTINGS
- Weldments "CAST-WELD" Design
- ROLLS: Steel, Alloy Iron, Alloy Steel

For 59 examples of the latest advanced engineering developments by BIRDSBORO, write today for our new Mill Machinery Brochure, "You're a Steel Specialist . . . ".

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BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., Main Offices in Birdsboro, Pa. District Office: Pittsburgh, Pa.

New York Office: **Engineering Supervision Co.,** *120 West 42nd Street, New York 36, N.Y.*

It's easier to strike a match on plate glass than on the raceway of a quality ball bearing. The raceway's smoothness makes it virtually impossible. Even so, not all bearing raceways are equally smooth.

Hoover Honed Raceways are super smooth . . . superbly finished

Bearing life—load capacity—quietness. These and other factors in ball bearing performance depend largely on the smoothness and finish of the bearing's raceway.

And that's where *Hoover Honed* Raceways pay off . . . in extra smoothness and finish. All makes of bearing raceways are ground. But Hoover Raceways are also *fully honed*. Hoover Honing, a patented process developed by Hoover, is the last word in precision finishing for raceways.

Coupled with *Hoover Honed* Raceways are matched sets of Hoover *Micro-Velvet* Lapped Balls, made to unusually high standards of smoothness and roundness. Precision throughout the working surfaces achieves superior ball bearing quality . . . assures long life and unexcelled performance.

Investigate Hoover's line of ball bearings in the light, medium and heavy series, available in a variety of types. Hoover engineers are ready to assist manufacturers with engineering and design information. Write Hoover about your problem.

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BALL AND BEARING COMPANY, ANN ARBOR, MICHIGAN

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Common Causes Of Bearing Failure

What makes an anti-friction bearing stop doing its assigned job? Improper lubrication, foreign bodies, soft balls or raceways, poor race concentricity, high operating temperatures and incorrect bearing selection—all are possible causes for premature bearing failure.

Common causes of bearing failure is but one of the many problems confronting users of anti-friction bearings—this problem as well as others pertaining to bearings are given concise coverage in the Hoover Handi-Book of Anti-Friction Bearings. Write for your copy today . . . it's written to help you select the right bearing for any application.

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Ann Arbor, Michigan.

Mail my copy of "Hoover Handi-Book of Anti-Friction Bearings."

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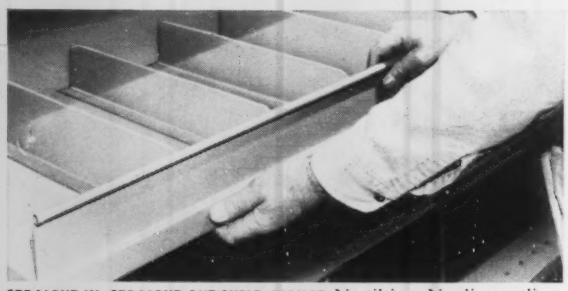
Only New HALLOWELL *ERECTOMATIC*® Steel Shelving

cuts assembly time, permits fast repositioning of shelves —gives you these plus features

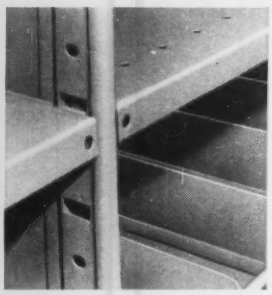


STRAIGHT-IN, STRAIGHT-OUT SHELF CHANGE. No tilting. No dismantling. No interference with any other shelf.

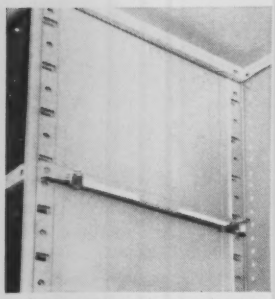
INDEPENDENT SHELF POSITIONING. Each shelf can be repositioned individually in seconds.

FULL USE OF SHELF AREA. No tees or angles, and beaded posts save valuable space.

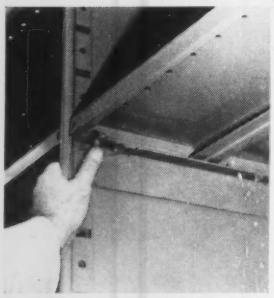
COMMON SIDE PANELS AND POSTS save material between adjacent units in a rack. Back and side panels are one-piece.



BEADED POSTS AND FLANGED SHELVES prevent snagging of clothing or stored goods, protect workers.



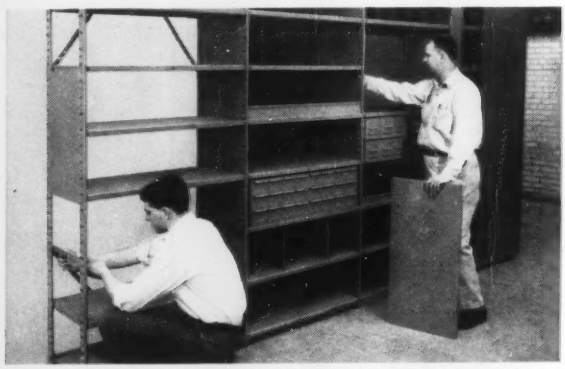
FULL DEPTH SHELF SUPPORT. No buckling possible. Reinforcements can be added when required.



4 CLASSES OF SHELVES. Regular, medium, heavy and extra-heavy construction meets all load requirements.

No matter what type of shelving you need—open, closed, bin units, ledge units, counters or cabinets—new Hallowell ERECTOMATIC® steel shelving makes the job easy. The unique built-in locking device*—developed by SPS—speeds assembly and rearrangement of shelves. To position a shelf, slide it into place on the shelf supports, press the locks, and the shelf is locked. To reposition a shelf, release the locks, pull the shelf straight out, slide it straight in on its supports at the new location, and press the locks. It takes only seconds to do the complete job. Made of prime steel, phosphate coated, and finished in SPS green baked-on enamel—other colors are available. Hallowell ERECTOMATIC steel shelving is stocked by leading industrial distributors and shop equipment dealers. For complete information, see the one nearest you. Or write Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

*Patent applied for



TWO MEN ASSEMBLED new Hallowell ERECTOMATIC steel shelving in just over 10 minutes. Closed unit was 36 in. wide, 18 in. deep, 7 ft. 3 in. high, complete with seven shelves. Standard models of other design required 13-55 min. Table shows test results.

Brand	Time to Assemble (Min.)	Units Per Hour
Erectomatic	10.42	5.75
A	13.23	4.53
B	14.24	4.21
C	16.30	3.68
D	18.12	3.31
E	25.03	2.40
F	55.03	1.09

HALLOWELL® SHOP EQUIPMENT DIVISION

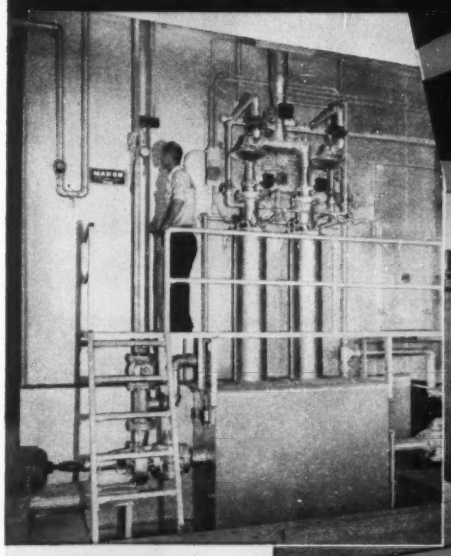
STANDARD PRESSED STEEL CO.

SPS

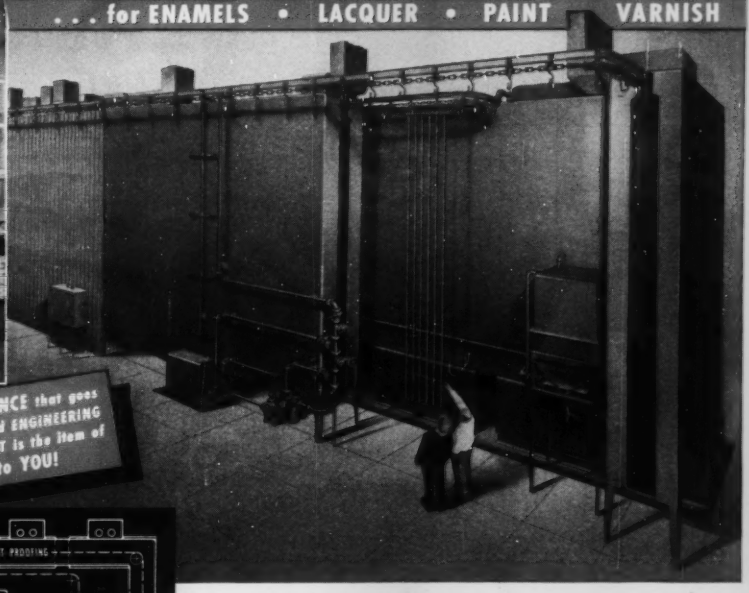
JENKINTOWN PENNSYLVANIA

COMPLETE *Finishing* SYSTEMS

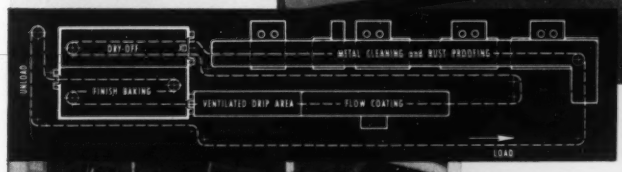
. . . for ENAMELS • LACQUER • PAINT • VARNISH

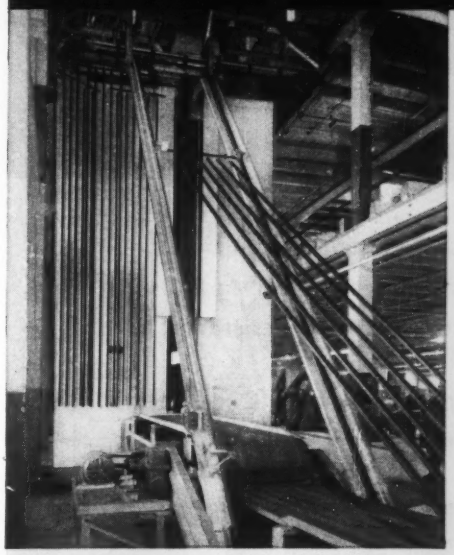


Mahon FIRE-JET Heating Units on the solution tanks of Mahon Five-Stage Metal Cleaning and Rust Proofing Machine—part of the Complete Mahon Finishing System at MULT-A-FRAME Division of Ainsworth Manufacturing Corporation, Detroit, Mich.



. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!





Exit end of Mahon combined Dry-Off and Finish Baking Oven showing Automatic Unloading Conveyor Ramp and Belt Type Handling Conveyors on the first floor at the Ainsworth Plant.

Ainsworth MULT-A-FRAME Channels are Painted in MAHON EQUIPMENT!

When the MULT-A-FRAME Division of Ainsworth Manufacturing Corporation was confronted with a finishing problem, they turned to Mahon for the solution. The product is a box channel 20 ft. long with only a ½" slot in one side—these are cleaned, rust proofed and painted outside and inside. Two hundred channels are finished per hour. Thousands of Fittings, Concrete Inserts and other MULT-A-FRAME parts and accessories are also finished on the same line. The finishing equipment extends from a pit in the first floor to the second floor ceiling. Oven Heating Units, Recirculating Fans and Exhaust Fans are located on the third floor. Automatic loaders and unloaders, with ramp conveyors from the first floor, load and unload the main conveyor which is located 27'-5" above the first floor. This is another Complete Mahon Finishing System designed and built by Mahon to do a specific job efficiently and economically. If you have a finishing problem, or are contemplating new finishing equipment, you will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . better qualified to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. You will also find that Mahon equipment is built better for more economical operation over a longer period of time. Mahon's background history in this highly specialized field covers thousands of Complete Finishing Systems including Dip, Flow Coating and Spray Equipment for every conceivable product painted on a production basis. See Sweet's Plant Engineering File, or write for Catalog A-657.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

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Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

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CLEAN, UNIFORM BILLETS–STRIP–RECTANGULAR, ROUND, FLAT RODS

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'round the world they go . . .

Lectromelt* FURNACES

and a world-wide family building them

Metallurgical and chemical industries the world over use Lectromelt . . . the efficient, versatile electric furnaces designed by Lectromelt of Pittsburgh, U.S.A.

A carefully selected family of companies all over the world are licensed to manufacture and erect Lectromelt furnaces. Together, we have installations from South Africa to Finland, Chili to Canada, Turkey to Hawaii . . . anywhere melting, smelting, refining and reduction furnaces are needed.

For further information, write to Lectromelt Furnace Division, McGraw-Edison Company, 323 32nd Street, Pittsburgh 30, Pennsylvania.

**Reg. T. M. U. S. Pat. Off.*

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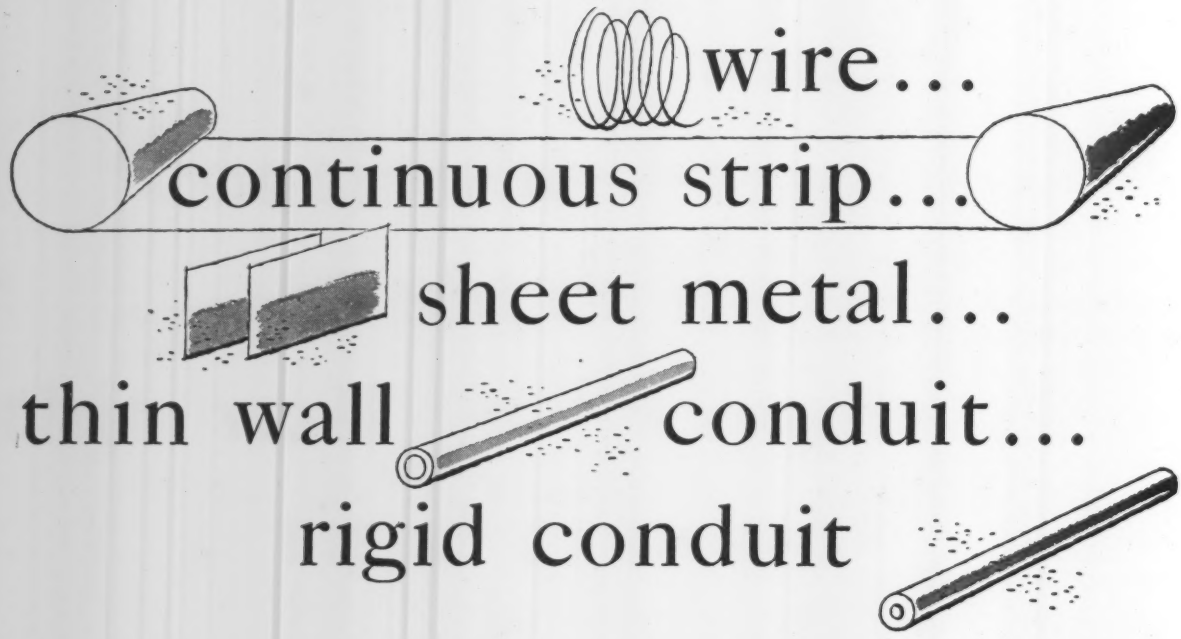

YOU CAN *Automate* ALL THESE OPERATIONS:

- cleaning
- pickling
- plating
- phosphating
- scrubbing
- paint prep
- electrogalvanizing

For Faster, Better Production . . . At Far Less Cost
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WRITE today, at no obligation, for the facts about an H-VW-M System that can bring cost-saving *automation* to your continuous line finishing—a system that can be integrated with your shearing, forming, slitting or annealing operations.

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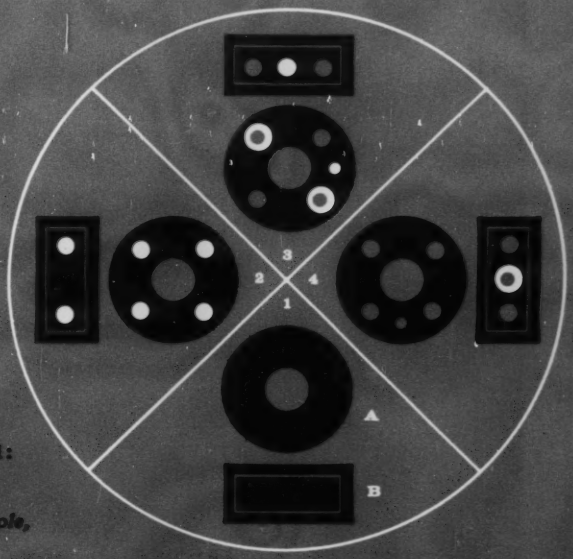
Natco Naturals

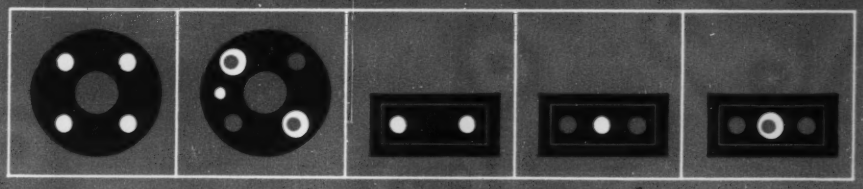
Cost-Cutting Ways
You Can Use
Standard Multi-Spindle Natcos

Any time your parts require machining *more than one hole*—drill, bore, face or tap—it may well be a "Natco Natural." Your standard Natco will produce substantial savings in a surprising number of situations, *even in small job-shop lots!* Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.

Multiple Drilling Operations on Two Part-faces



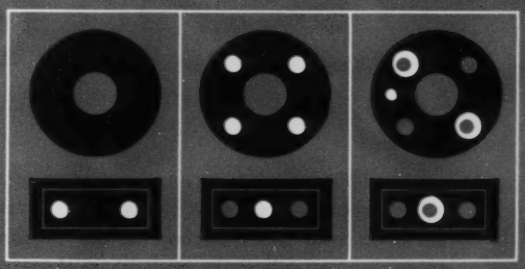
130 parts per hour—4-position rotary table. POSITION #1: *Unload finished part, transfer half-finished part, load new part.* POSITION #2: *Drill 4 holes, Face A. Drill and countersink 2 holes, Face B.* POSITION #3: *Drill 1 hole, ream 2 holes, Face A. Drill 1 hole, Face B.* POSITION #4: *Trepan 1 hole, Face B.*

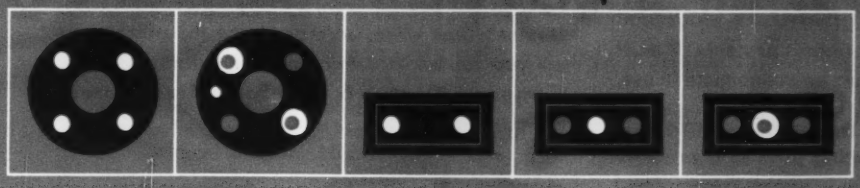


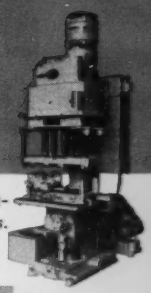
65 parts per hour—stationary fixture *with 5 work locations. Operator transfers parts after each stroke. One part completed per stroke.*

40 parts per hour—straight-line indexing. *After every 3 strokes, operator unloads finished part, transfers half-finished part and loads fresh part.*

23 parts per hour—tumble-type fixture. *Operator transfers and tumbles fixture from one position to the next. One part completed every five strokes.*







Standard multi-spindle Natcos range from 1 hp, 10-spindle machines to 50 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms of bored slip plates.

NATCO

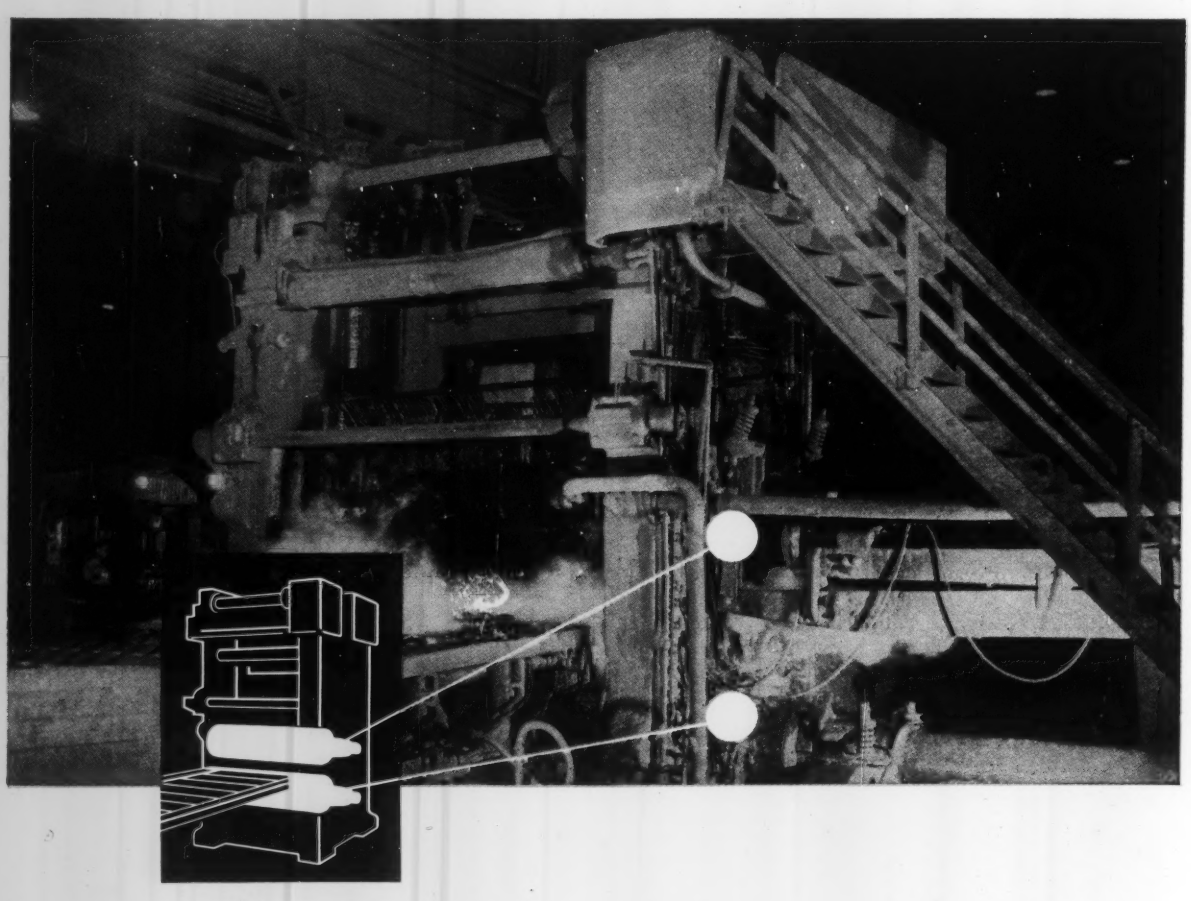
National Automatic Tool Company, Inc.

Richmond, Indiana

Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.

Lubricating roll necks is no easy job



Lubricating the roll necks of a steel mill calls for a lubricant that will resist high temperatures. The lubricant must also function in the presence of steam, water, mill scale and other abrasive materials. It has to cushion great shock loads and cling tenaciously to the bearings it protects. It must last a long time . . . and it must be economical in use.

Atlantic Lubricant 10 performs exceptionally well in this service. It is being used in a pressure system on the mill illustrated, at the Lukens Steel Company in Coatesville, Pa., for the lubrication of roll neck bearings, pinion and spindle bearings.

Selecting the correct lubricant for the job is simplified when you call in your Atlantic Lubrication Engineer. He is a man with years of on-the-job knowledge of heavy industrial lubrication requirements of all kinds.

Why not see for yourself the value of Atlantic service? Just write, wire or phone the office nearest you for full information. The Atlantic Refining Company, Dept. S-6, 260 South Broad Street, Philadelphia 1, Pa.

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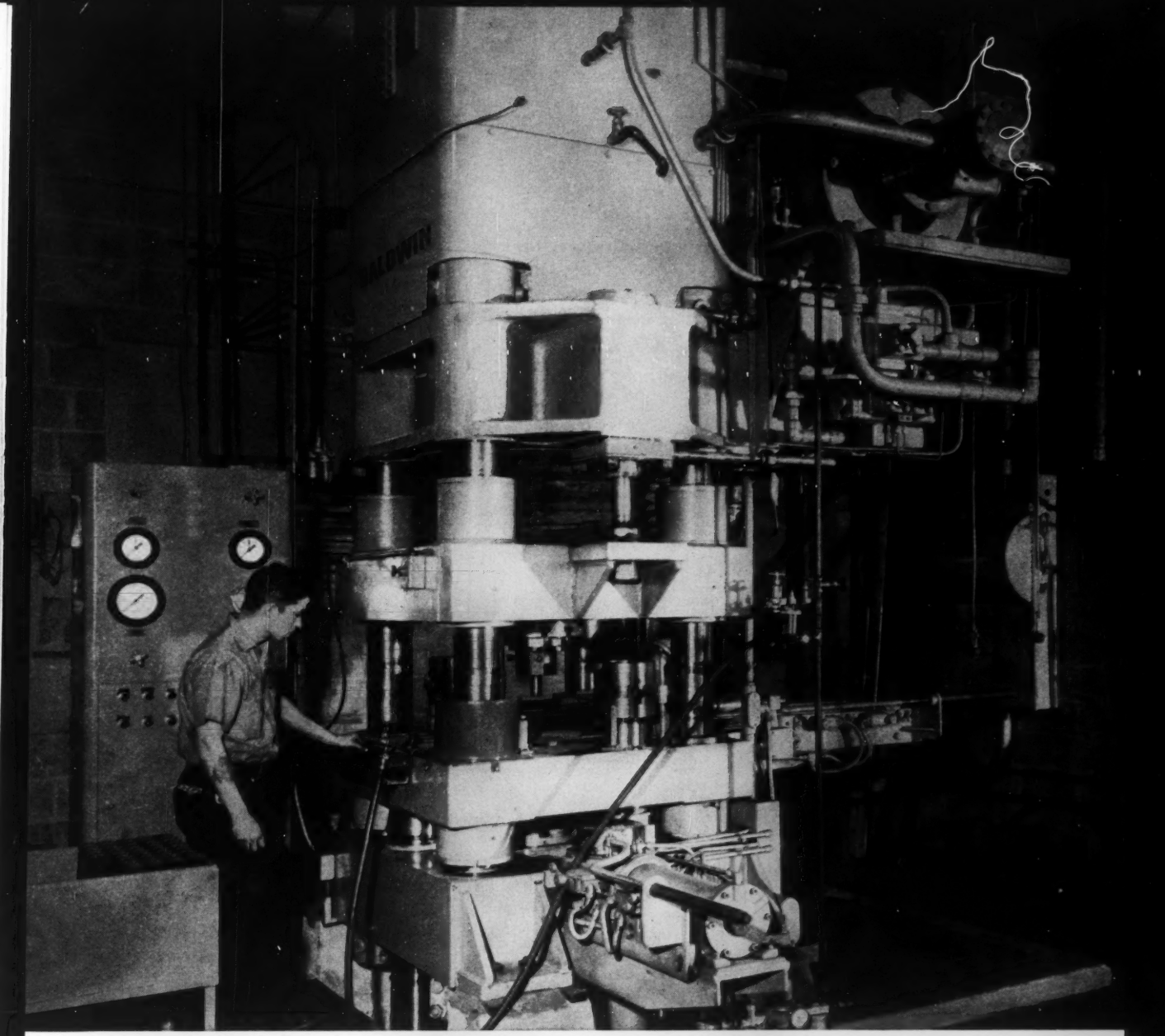

New Baldwin hydraulic press

Combines high tonnage capacity with multiple motions normally found in small presses

Pictured above is a new 500-ton-capacity Hamilton hydraulic compacting press now in operation at the Burgess-Norton Mfg. Co., Geneva, Ill. Designed for compacting powdered metals, the new press embodies these features proven desirable in Baldwin's line of smaller presses:

Floating die • Automatic cycling • Die float control
Shuttle feeder • Accurate load downstops

These motions are made possible even in high tonnages at relatively low cost. The press features convenient control of the forces being exerted—and accurate control of the finished size of the part being formed.

This Hamilton compacting press is also made in 300, 750 and 1000-ton capacities. Write today for complete details, including specifications.

Hamilton Division Hamilton, Ohio

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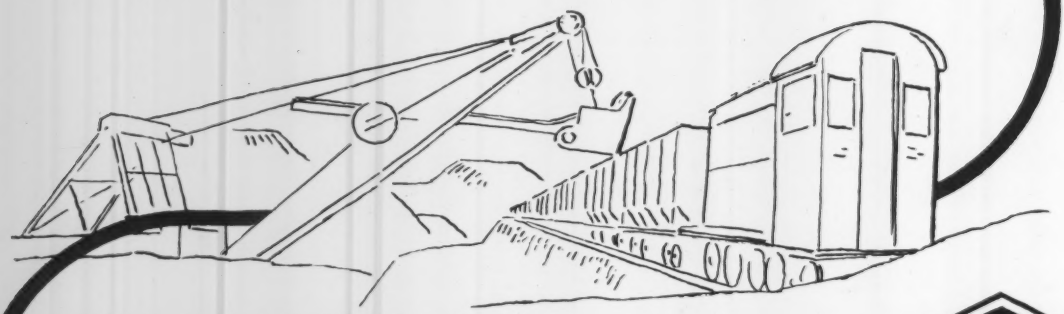
FROM START TO FINISH

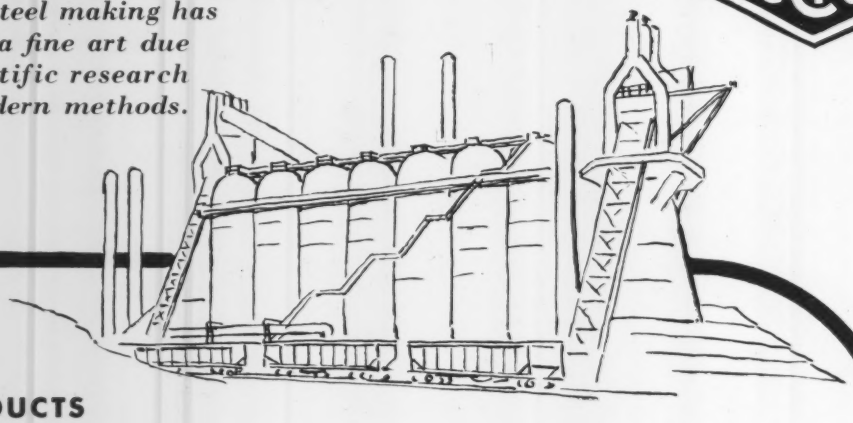
ORIGIN

Cliffs iron ores are found wherever good steel is made.



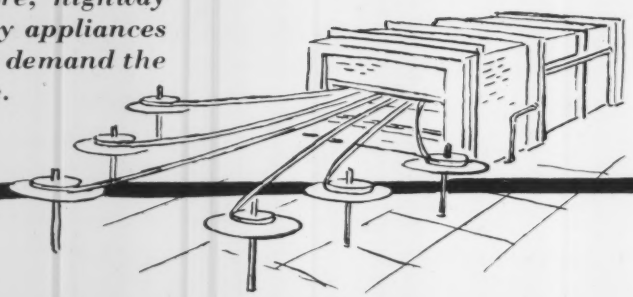
STEEL MAKING "KNOW HOW"

Today, steel making has become a fine art due to scientific research and modern methods.



STEEL PRODUCTS

In manufacture of fine kitchen, store, highway and auxiliary appliances steel makers demand the best iron ore.



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The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

"Our equipment has to produce — so we got PANGBORN BLASTMASTERS"

says Mr. W. BLACKMER, Foundry Superintendent,
Muskegon Piston Ring Company, Sparta, Michigan

4 Blastmaster® Barrels replace 6 air blast barrels and 10 tumbling mills . . . cut two and three shifts a day to just one

"We maintain over 4,000,000 finished castings in stock for immediate shipment. To keep this stock replenished, our blast cleaning equipment has to really turn out the work. And we want a good job, too! We have found that our Pangborn Blastmasters fill the bill on both points—production per manhour is amazing."

If *you* need blast cleaning equipment, look at all makes. Then check the Pangborn Blastmaster. You'll find it offers many exclusive features plus a choice of sizes to fit your needs—1½, 3, 6, 12, 18 and 27 cu. ft. Write for Bulletin 703 to PANGBORN CORP., 1600 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

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Chain for transmission of power—providing maximum strength with minimum weight, but with ample reserve strength to withstand sudden and heavy overloads. Chain for every elevating and conveying need—built for rigorous and continuous service under the most trying conditions.

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Jeffrey chain and accessories are stocked for your convenience by your Jeffrey distributor. For help in selecting chain for any job, call them or get in touch with The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

We can help you with modern, efficient equipment for Materials Handling • Chain Applications • Materials Reduction • Processing • Sanitation • Mining... and with a contract engineering-manufacturing service for your products. Jeffrey guarantees your enthusiasm!

JEFFREY

Founded in 1877

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The Boston Gear Catalog No. 56 is "the book" in constant use by men who specify and buy gears and other transmission parts, — for good reasons. They know it lists over 2000 types and sizes of standardized stock gears. They know that Boston Gears are top-rated for precision and performance. And they know, also, they can get

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Why pay more (and wait) for "specials" when you can get Boston Gears FROM STOCK, nearby, to meet any specification? Be cost-wise . . . STANDARDIZE. Get your copy of Catalog No. 56. You'll be days and *dollars* ahead on any transmission job. Boston Gear Works, 73 Hayward Street, Quincy 71, Massachusetts.

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Stock Gears • Sprockets and Chain • Speed Reducers • Bearings • Couplings

COMPACT . . . POWER-PACKED TRI 55 CLAD MOTORS

Plan now to use G-E TRI 55 CLAD motors in ratings to 125-hp

REG. U.S. PAT. OFF.

Increased production throughout U.S. industry has created a demand for more powerful machines with greater speeds and increased capacity. To meet this demand, General Electric will soon announce a wider range of Tri-Clad '55' motors in compact . . . power-packed dimensions.

ADVANCE INFORMATION—Experienced engineers and skilled craftsmen have utilized revolutionary new materials and the most modern production techniques to pack more power into these larger G-E motors built to new NEMA standards. The more rugged, higher horsepower motors will feature easy installation, reduced maintenance, and long-life performance.

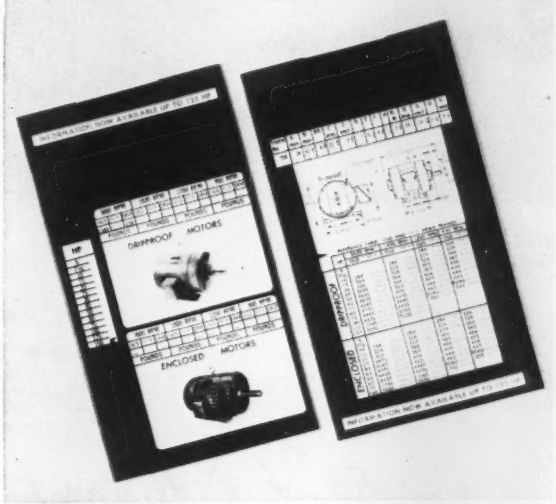
PLAN AHEAD—New Tri-Clad '55' motors can mean real savings in your plant modernization project and in new product design. For complete details on the wider range of motors, contact your nearest General Electric Apparatus Sales Office. For advance size information, send in the attached coupon for free slide rule. General Electric Company, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC

FREE SLIDE RULE

ADVANCE INFORMATION TO HELP YOU PLAN AHEAD



FREE SLIDE RULE—Write for free slide rule which lets you determine at a glance the weight and space-saving benefits of new Tri-Clad '55' motors up to 125-hp. This handy slide rule provides advance information to solve your design problems . . . to benefit your over-all operation.

SECTION G891-2

GENERAL ELECTRIC COMPANY

SCHENECTADY 5, NEW YORK

I would like advance information on new dimensions of Tri-Clad '55' motors up to 125-hp. Please send me free slide rule.

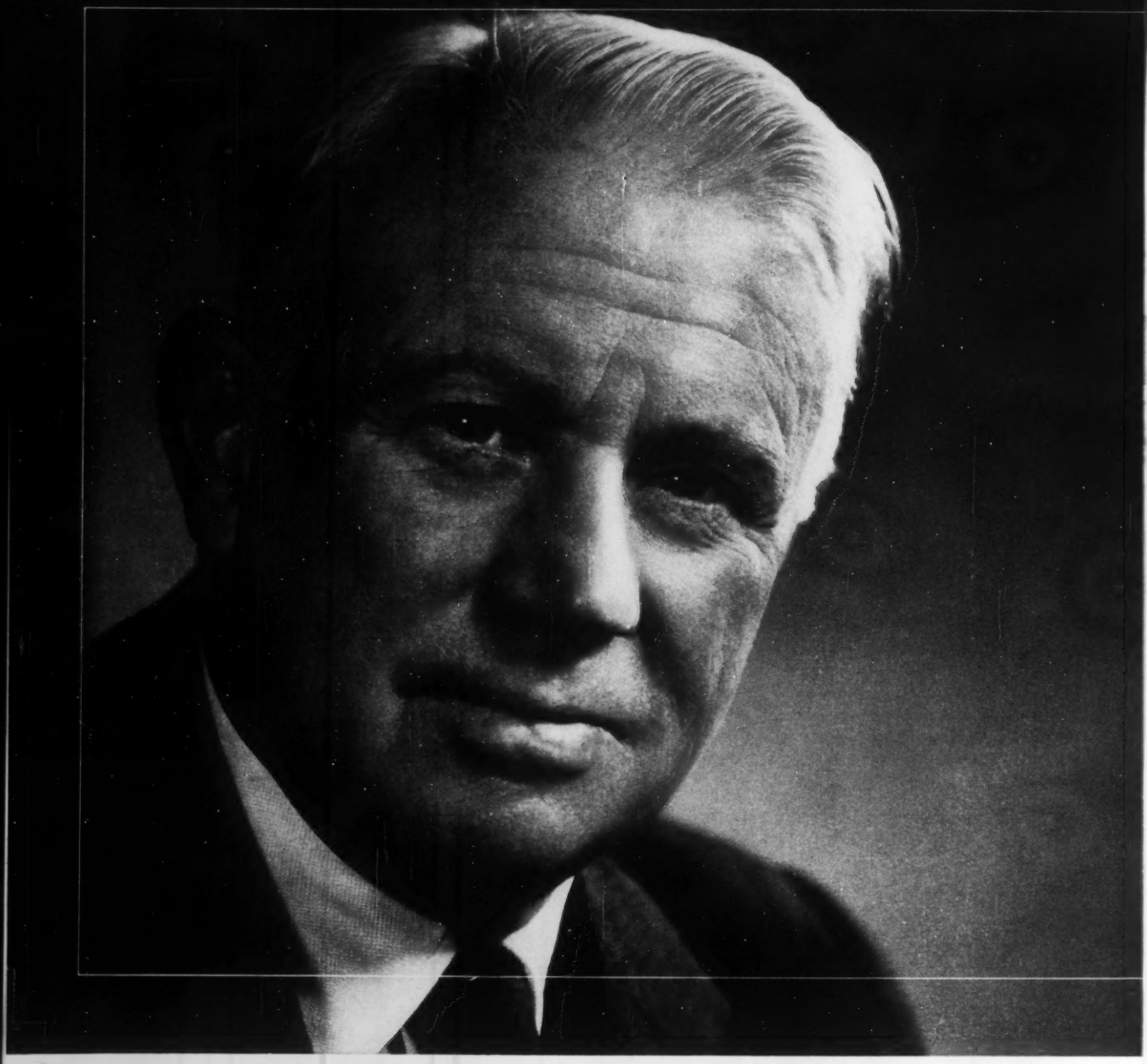
NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY & STATE_____



Number 2 in a Screw Research Association Series on Industrial Statesmen

ERNEST SWIGERT

stresses the importance of quality

"In the final analysis, the quality of any product depends on the pride and integrity of the maker. A reputation for quality, once acquired is like the 'Sterling' stamp on silver — an assurance to the user that the product will live up to his expectations. To adhere consistently to high standards regardless of competition is industrial statesmanship at its greatest, and also the best course for continued success."

Ernest G. Swigert

President, National Association of Manufacturers
President, Hyster Company

Product Reliability for YOU in the Quality Control of Phillips Screws

There are many manufacturers of Phillips Cross-Recessed Head Screws. It is important for you to know that some of them are members of Screw Research Association for this major purpose:

To make sure that the quality of their products remains the very highest, regardless of competition. They accomplish this by rigidly controlling manufacture according to standards set up by Phillips Cross-Recessed Head Standards Committee.

Product reliability in Phillips Screws demands that they be entirely trouble-free — and that they deliver every advantage inherent in the Phillips Recess design. Recess dimensions must meet the close tolerance standards established by the Phillips Cross-Recessed Head Standards Committee.

Phillips Screws made by these companies improve your products. They also reduce your production costs.

Members of Screw Research Association . . .

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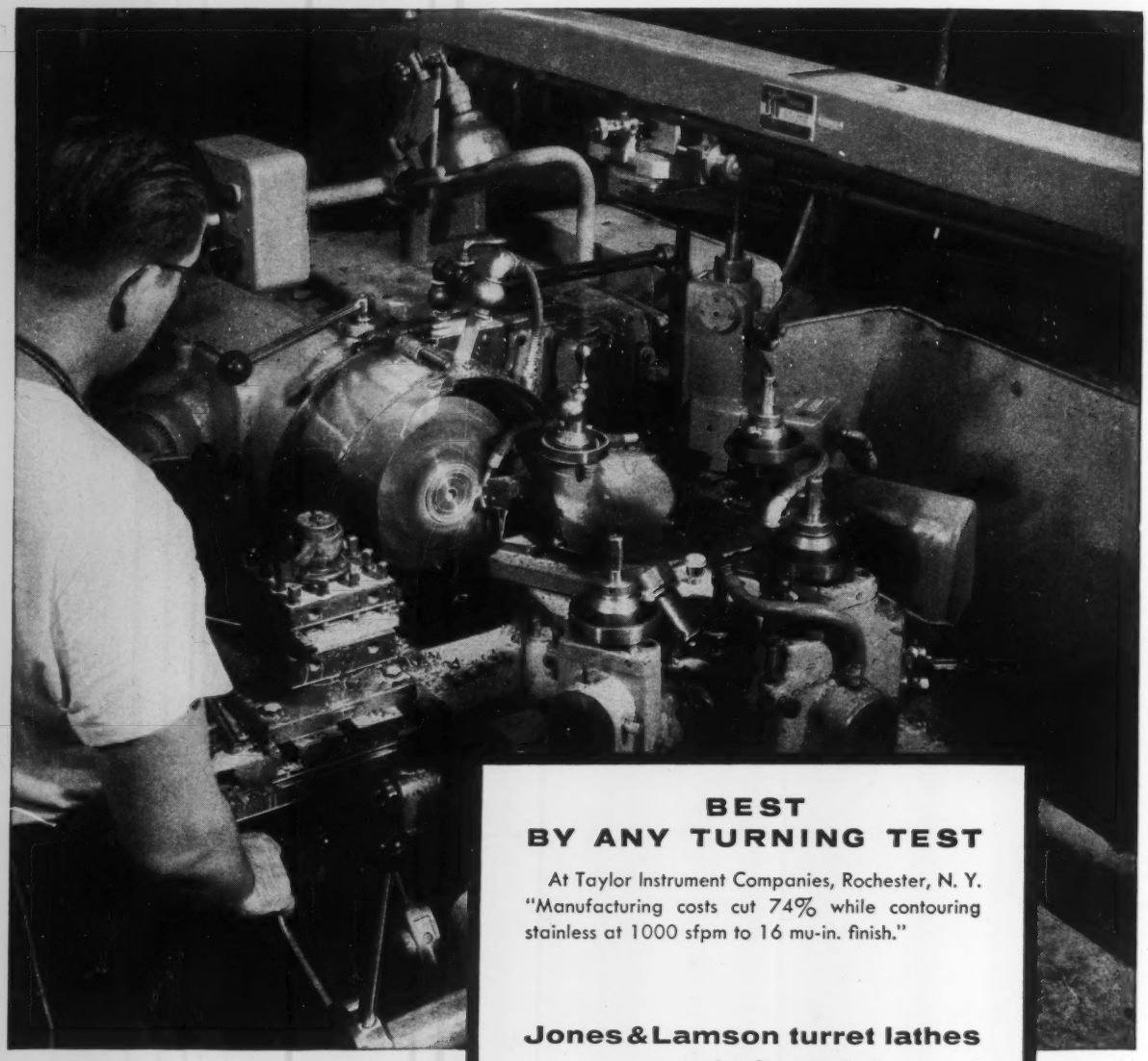
You can rely on these sources . . . for product reliability

THE GENUINE QUALITY PHILLIPS SCREWS



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BY ANY TURNING TEST

At Taylor Instrument Companies, Rochester, N. Y. "Manufacturing costs cut 74% while contouring stainless at 1000 sfpm to 16 mu-in. finish."

Jones & Lamson turret lathes are built and powered to produce...

MORE CHIPS per tool
MORE PIECES per hour
MORE PROFIT per job

than any other turret lathe of comparable size!

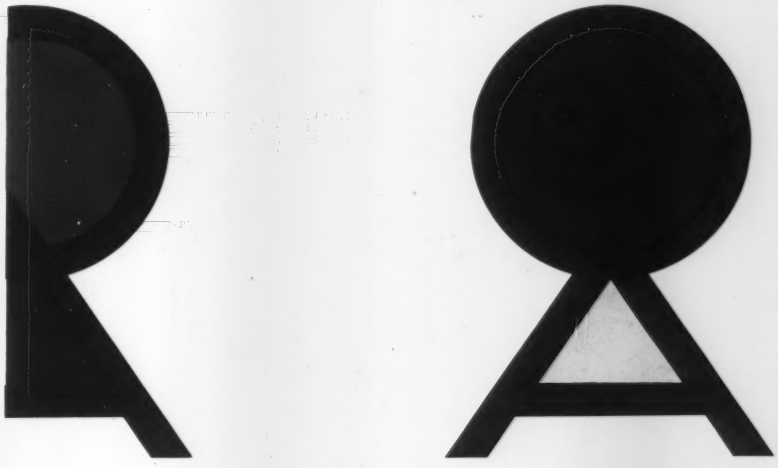
Write Jones & Lamson for details

JONES & LAMSON

the man who needs a new machine tool is already paying for it

JONES & LAMSON MACHINE COMPANY, 517 Clinton St., Springfield, Vt., U.S.A. J&L **MACHINE TOOL DIV.**

Symbol of a new concept of service standards in the Aluminum Industry



OLIN ALUMINUM's full integration means dependable delivery for you

Olin Aluminum is already in production, and soon an initial annual capacity of more than 240 million pounds will be a reality! Thus, from an investment of over 300 million dollars, a fully integrated operation is emerging — complete from new ore ships to Rolling Mills and Extrusion Plants.

Guiding this entrance of Olin Mathieson Chemical Corporation into Aluminum has been a firm determination to develop the most modern, technically advanced production facilities. And now, the full integration of these facilities, plus Olin Mathieson's extensive experience in non-ferrous metals, promises you a new standard of quality and service unique in the Aluminum Industry.

Olin Aluminum, produced with such ultra-modern facilities, will be of the finest quality — custom-made to your needs. But even more important, our full integration plus our established principles of doing business will mean greater assurance of on-time fulfillment of every commitment to you. Behind this assurance will stand the full-time assistance of imaginative technical and service staffs — people chosen for experience we feel to be unexcelled in the Aluminum and metals field.

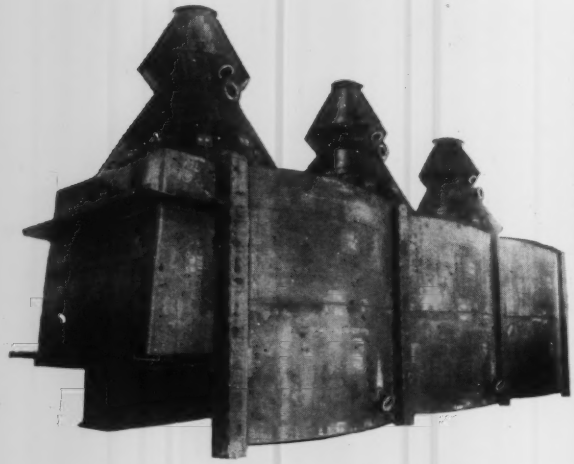
Soon, the men from Olin Aluminum will be coming your way to tell you more about us. Meanwhile, we welcome inquiries. Write to: Aluminum Division — Sales, Olin Mathieson Chemical Corporation, 460 Park Avenue, New York 22, N. Y.

OLIN ALUMINUM

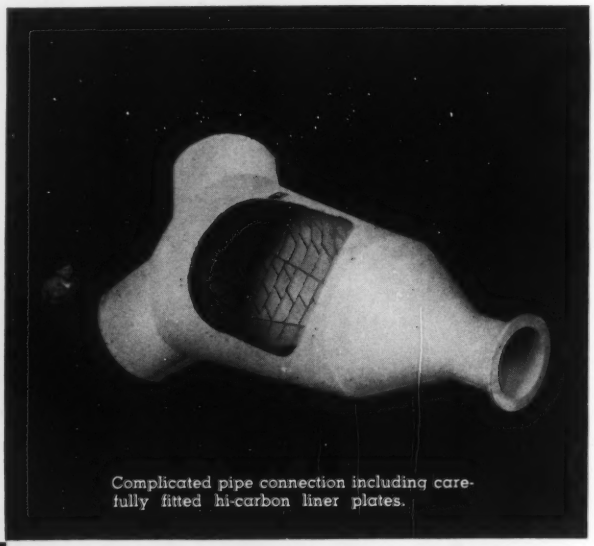
AND "OLIN ALUMINUM" ARE TRADEMARKS

Complete Facilities

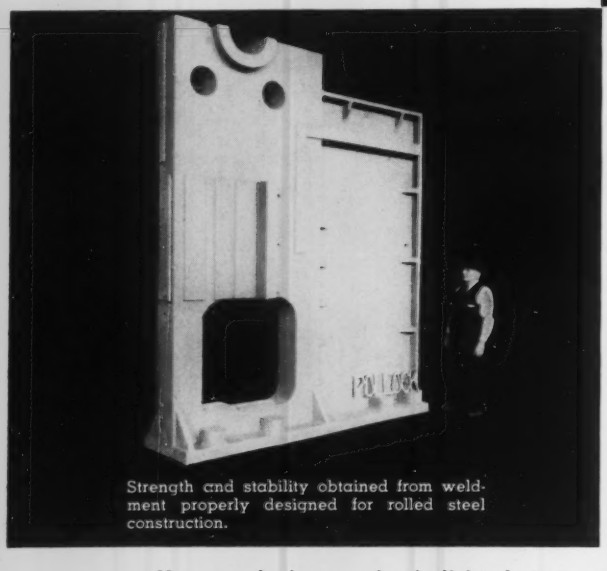
for all steel plate fabrication and erection



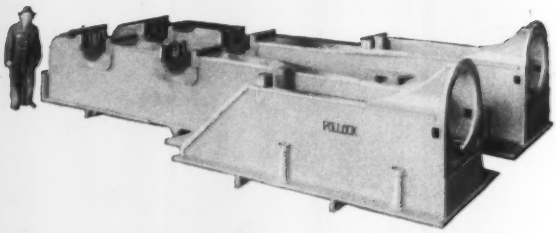
Intricate light gauge steel construction requiring precision fitting.



Complicated pipe connection including carefully fitted hi-carbon liner plates.



Strength and stability obtained from weldment properly designed for rolled steel construction.



Heavy weldment replacing steel casting, making better job and with considerable savings.

BLAST FURNACES • HOT METAL CARS AND LADLES
CINDER AND SLAG CARS • INGOT MOULD CARS
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Your steel plate work of all kinds is in safe hands at The William B. Pollock Company. Pollock methods, machines and men have served the steel industry since 1863.

Pollock's modern production techniques and experience help cut your costs on all steel plate work. Precision machines are employed in forming, flame cutting, welding and machining plate from ¼" to 7" thick. If your weldments have finished surfaces or are joined to machined castings, Pollock can do the entire job for you . . . we are prepared to erect in the field the steel we fabricate. Your inquiries are invited.

STEEL PLATE CONSTRUCTION • ENGINEERS • FABRICATORS • ERECTORS

THE WILLIAM B. POLLOCK COMPANY

Since 1863

YOUNGSTOWN, OHIO

What's in a Name?

EXLO®

A name alone means little—it is the product behind it that counts.

There's always that extra margin of quality in the Vancoram Green Drum.

Since Vancoram EXLO was introduced in 1952, it has become known throughout the steel and iron industry as a product of the highest quality—particularly for the manufacture of low-carbon, stainless and heat-resisting steels and irons.

EXLO—a true ferro alloy—has these advantages, and more!

- . . . *a high chromium-carbon ratio*
- . . . *controlled low silicon content*
- . . . *high density*
- . . . *exceptional cleanliness*
- . . . *extra low-carbon content (.025% and .05% max. grades)*

If you are one of the few who are not familiar with EXLO, call your nearest Vanadium Corporation Office for helpful assistance.

VANCORAM

VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y.
Chicago • Cleveland • Detroit • Pittsburgh
Producers of alloys, metals and chemicals

"Here's a hot one for the slitters

60,000 lbs. of slit coils . . . delivered early tomorrow!"

A TRUE STORY *of Ryerson service—the kind that makes Ryerson your best source for every steel requirement.*

It was ten after five. The phone rang and a steel buyer 80 miles away said: "I've simply got to have 60,000 lbs. of slit coils first thing in the morning."

Impossible?

Not at Ryerson. This kind of service is what Ryerson customers have learned to count on when emergencies arise.

The needed steel was on hand in Ryerson stocks. Unequalled slitting equipment was put to work. And during the night two different gauges of steel coils were slit to meet two size requirements. Early next morning the steel was delivered *as promised* . . . 80 miles away.

You don't have to wait for an emergency to appreciate Ryerson service. Our stocks and processing facilities enable us to meet practically every demand for steel—no matter what the shape, size, quantity or time requirement.

In addition, you can always depend on Ryerson for steel of high uniform quality.

So call your nearby Ryerson plant for steel or help on steel problems with the assurance of close personal attention by specialists who make your problems their own.

***In stock:** Carbon, alloy and stainless steel—bars, structural, plates, sheet and strip, tubing, re-bars—industrial plastics, machinery & tools, etc.*

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

STEEL

June 17, 1957

Metalworking Outlook

Three Musts for an Independent

The short line appliance maker can survive, says one who has, Fred Maytag II, president of Maytag Co., Newton, Iowa. The three musts for an independent: To develop and efficiently produce a well engineered product; to distribute, advertise and service efficiently; and to establish good relations with retail dealers. Since 1917, 215 companies have been in the home laundry equipment business; today, only 25 are left. Of those, 12 are short line independents—two market only ironers; two market only dryers; three market only wringer washers; five market a fairly complete line.

Gas Turbine Could Compete Now

The gas turbine is nearly ready to compete with piston engines in certain commercial and military areas. General Motors Corp. engineers believe heavy duty and military vehicles could be put on the road today with "no additional engineering breakthroughs required." But the turbine does require superhighways that can handle large, heavy rigs and high hauling speeds.

Barges Staging a Comeback

Granite City Steel Co.'s transportation data indicate the increasingly important role of barge traffic in steel hauling. Its outbound tonnage by barge in 1956 was 34 per cent greater than it was in 1955, although total shipments were up only 10 per cent. The company is using this form of transport for a part of every major product. Bargeline traffic has enabled it to remain competitive with Chicago mills in the Minneapolis-St. Paul market. And it expects to sell competitively at points as distant as Tampa, Fla., as the result of a new barge service to that area.

U.S. Shipbuilding Triples

The U.S. is now sixth among the principal shipbuilding nations of the world. As recently as a year ago, it was tenth. As of Apr. 1, ships on order in this country total 102 and aggregate 2,341,332 gross tons. That's 7.1 per cent of the world's orders. A year ago this nation accounted for only 2.2 per cent. Great Britain still leads the shipbuilding nations. West Germany is second, Japan third.

Industry Rediscovers America

The rediscovery of America is the result of industrial decentralization, believes Elmer F. Twyman, vice president, Yale & Towne Mfg. Co., New York. Because of U.S. communication and transportation systems, "nothing is distant anymore, and all Americans are neighbors," he told the National Citizens Planning Conference at Little Rock, Ark. Industry is being estab-

Technical Outlook—p. 103 Market Outlook—p. 153

lished all over the country and finding skilled workmen with "aptitudes for even the most complex industrial tasks," he added.

Capital Expenditures at New High

Capital expenditures on new plant and equipment will hit annual rates of $37.3 billion in the second quarter and $37.9 billion in the third quarter, says a survey by the Commerce department and the Securities & Exchange Commission. The new highs compare with annual rates of $36.9 billion in the first quarter of 1956 and $36.5 billion in the final quarter last year. Capital spending in the first nine months of 1957 will be 9 per cent greater than it was in the same period last year.

Inventory Reduction Is Slowing

Nearly half (49 per cent) of the firms reporting in the May survey of the Chicago Purchasing Association have stopped inventory reduction. Of the remainder (51 per cent), 90 per cent say they will cut inventories 10 to 20 per cent more.

Employment Rises

Employment rose by 900,000 during the month ended May 15, to a total of 65.2 million, the same figure reported a year ago. A joint release of the Labor and Commerce departments added that unemployment remained unchanged at 2.7 million over the month. The increase in employment was credited to a gain in the work force—housewives and students who were not on the labor market the previous month—rather than unemployed.

Metalworkers Decline

Metalworking and ordnance industry employment dropped 5000 in May from May, 1956, the Bureau of Labor Statistics reports. Primary metals was down 29,000; fabricated metal products, 6000; machinery (except electrical), 28,000; electrical machinery, 16,000; instruments, 1000. Transportation equipment was up 94,000. (All figures are seasonally adjusted.) Total nonagricultural employment was 52.6 million in May, compared with 51.8 million a year ago.

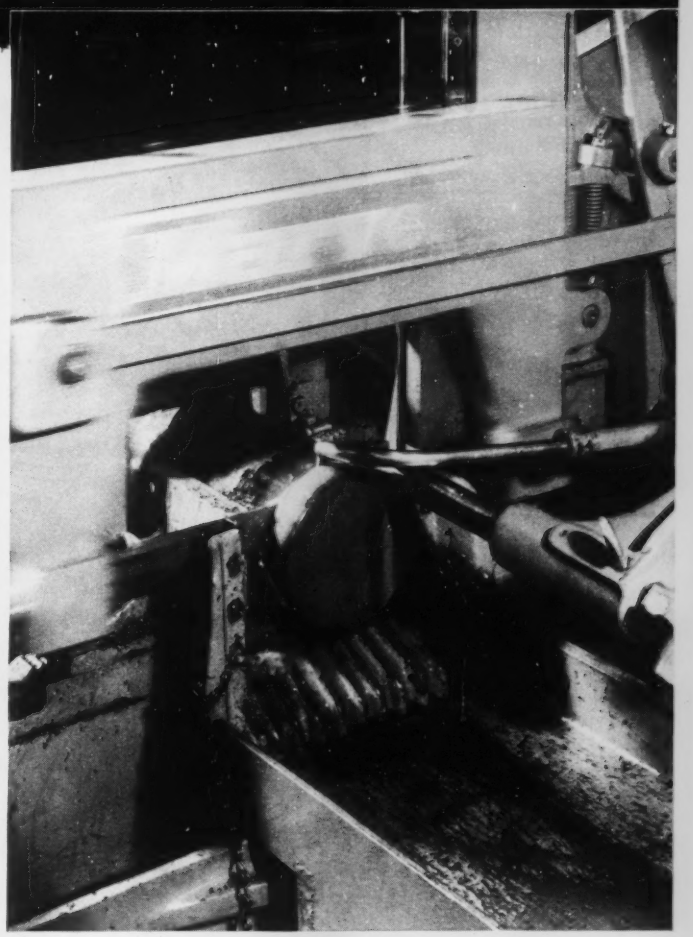
Straws in the Wind

Westinghouse Electric Corp., Pittsburgh, will supply power systems for the Fairchild F-27 propjet transport plane, expected by some to replace the "workhorse" DC-3 which has not been produced since the mid-'40s . . . Prestressed concrete can compete with steel in the construction of highway bridges, according to Bertram D. Tallamy, federal highway administrator . . . Radio-Electronics-Television Manufacturers Association is taking action to combat receiving tube counterfeiting, estimated to be a $100-million business.

5 Basic Reasons why MARVEL HACK SAWS CUT-OFF MORE ACCURATELY...

The consistently accurate performance of MARVEL Heavy Duty Hack Saws is no accident. MARVEL engineers knew, many years ago, that to produce and maintain accurate cutting-off, a hack saw must be designed and built like a fine machine tool.

Some of the basic design principles built into the modern MARVEL Hack Sawing System that makes it the most accurate cutting-off method you can use are:



1. V-Way Design...Greater Rigidity

Upright and Saddle are precision machined and fitted to form a rigid, integral unit capable of withstanding any cutting load with no deflection or side movement.

2. Anti-Friction Bearing Construction

Anti-friction ball or roller bearings are used at all load carrying points. Even the strongly braced saw frame reciprocates on heavy duty, fully enclosed preloaded ball bearings which provide permanent, frictionless rigidity and true-running, straight line cutting strokes.

3. Minimum Blade Frame Reach

Close-coupled design and crank lever action of MARVEL Saws keeps the saw frame and blade reach very short in relation to the vertical V-ways on which the unit is mounted. This insures optimum rigidity, even under the most severe operating conditions.

4. Positive Relief Blade Lift

On the return stroke, positive relief lift raises the blade to provide proper and "cushioned" lead-in on the next cutting stroke. This prolongs blade sharpness, life and accuracy.

5. Rigid Cutting Tool

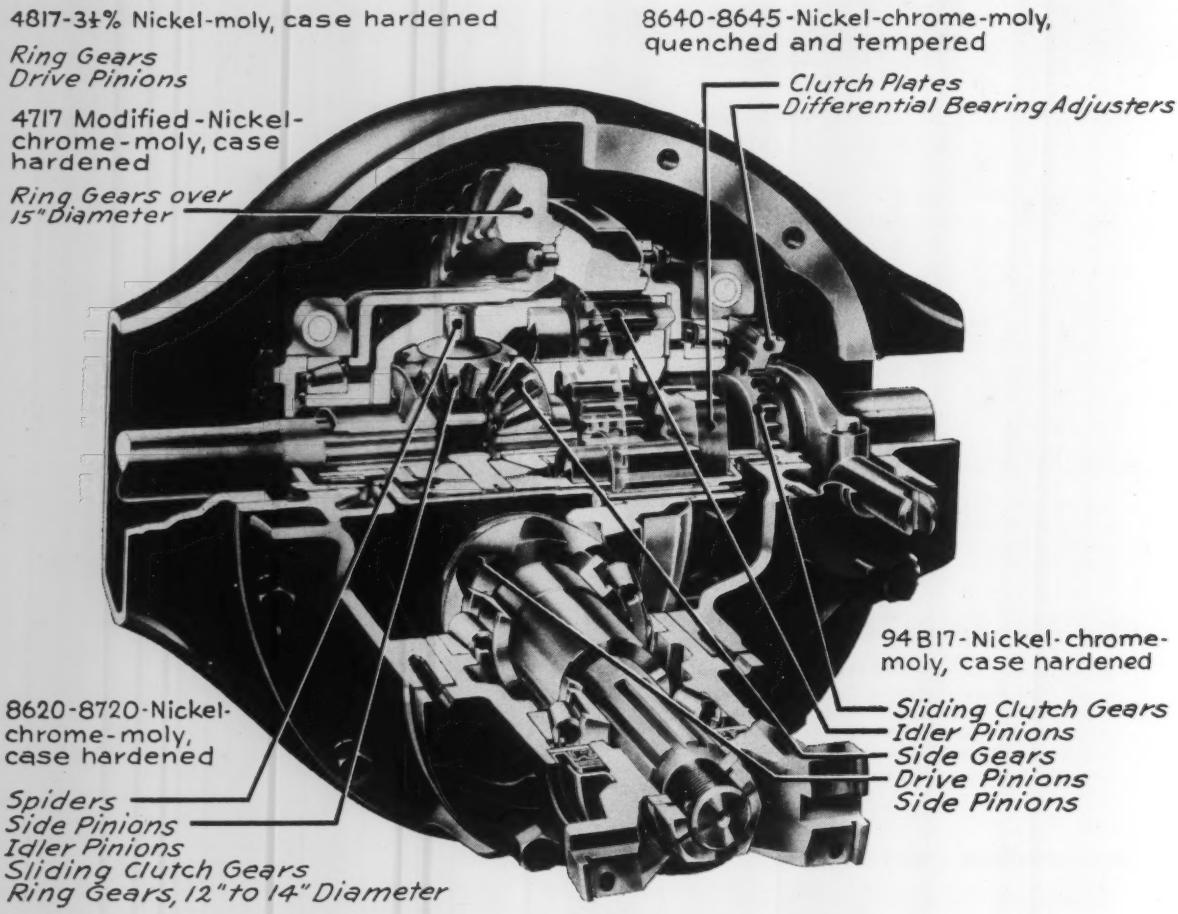
Cutting-off accuracy requires a rigidly held, relatively short cutting tool. MARVEL Unbreakable High-Speed-Edge Hack Saw Blades, which combine a narrow high speed steel cutting edge permanently welded to a tough alloy steel body, can be tensioned from 200% to 300% more taut than ordinary blades. This provides a most rigid cutting edge.

Write for the MARVEL Catalog and the complete story on MARVEL METAL CUTTING SAWS

MARVEL Metal Cutting SAWS
Better Machines–Better Blades

ARMSTRONG-BLUM MFG. CO.
5700 W. BLOOMINGDALE AVE., CHICAGO 39, ILL.

These are the nickel alloy steels that make Eaton's 2-speed, heavy-duty axles rugged and durable



Slip this ad under your blotter as a reminder.

It illustrates how a manufacturer – you perhaps – can take advantage of the versatility and true engineering economy of nickel alloy steels.

The picture is a view of an Eaton heavy-duty, 2-speed truck axle. It shows the steels Eaton Manufacturing Company of Cleveland, Ohio, uses to make the many axle types rugged and durable . . . hence economical.

Notice how carefully Eaton selected the steels. Each just right for the part.

Leading manufacturers and users of *super-heavy-duty* vehicles know that it does not pay to skimp on materials in parts such as rear axle drive pinions and ring gears. Use of lower alloyed substitute steels would result in frequent failures and replacements, time lost in the shop, more parts sent to the scrap pile, and more steel and alloys eventually consumed. True economy and efficiency means specifying the most durable and dependable materials for vital truck parts.

Moral of the story: what nickel alloy steels do for Eaton, they can do for you. The address below is another reminder: Inco will provide all possible assistance in selecting the most suitable steels for *your* service.

INCO TRADE MARK **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N.Y.

Dilemma in Distribution

Judging from the gripes we continue to hear, the striking gains in efficiency on the production line are not being matched by improvements in the distribution of products through middlemen.

Top efficiency in distribution is made difficult by the number of people involved and the amount of business they do. Some 19,000 of these independent sellers annually move about $9 billion worth of industrial products and equipment.

A breakdown shows about 15,000 are manufacturers' agents who carry no stocks; 2000 are wholesalers of industrial supplies who may stock 3 to 50,000 items; 1300 are steel and metal warehouses; and 250 are distributors of machine tools and other metalworking equipment.

Here are a few of the gripes:

Buyers say: Distributor salesmen too often are poorly trained and have inadequate knowledge of their products; deliveries are hit and miss (intolerable in case of a breakdown); manufacturers must be turned to when an engineering service or other problem is involved.

Distributors say: Manufacturers don't allow adequate profit margins (small orders must be handled at a loss); they don't provide enough product information, sales aids and advertising to back up selling; they don't give exclusive territories to eliminate competition on identical lines.

Manufacturers say: Distributors don't know their costs and cut prices unnecessarily to make a sale; they generalize too much on profit margins; they carry so many lines they can't help distributor salesmen in the field; they don't reinvest enough of their profits or train new personnel to insure continuance of their business.

Some of the cures indicated by the nature of the gripes are being applied. One distributor organization is digging deeply into distribution cost analysis and preaching the need for better accounting. Others are finding out more about their markets and customer attitudes through nationwide surveys.

Those forward steps will help untie the knots in our distribution system. But the job has just begun. Manufacturers cannot be expected to subsidize inefficient distributors. Neither can distributors be expected to represent for long manufacturers whose products are hard to sell.

Common sense suggests a broader approach. Because conflicting interests are involved, individual action will never be the complete answer. It will take the co-ordinated efforts of all three parties to reach a satisfactory solution.

Irwin H. Such

EDITOR-IN-CHIEF

P.M. of another good day

"Good" because this Inland Steel mill representative has just spent the day with a customer. Tired though he is, he's had the satisfaction of helping another steel user solve a knotty problem. That's his job—his and other Inland men like him who bring expert metallurgical knowledge to every assignment. They can help you select proper steels, establish specifications and may even suggest techniques to speed production, lower manufacturing costs. It's this kind of service that makes it good business to call on Inland for your steel needs.

INLAND STEEL COMPANY • 38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport • St. Louis • Kansas City • Indianapolis • Detroit • New York

Metalworking Exports Soar

	1957	1956
Jan.	$864.9 million	$372.8 million
Feb.	817.7 million	527.9 million
Mar.	1100.0 million	619.4 million
Apr.	874.4 million	700.0 million

Kaiser Aluminum & Chemical Corp.

More Hard Goods Leave U.S.

Metalworking industry sells $3.6 billion overseas during first four months of this year, up 63.6 per cent from last year. Foreign aid is a two-way street

DURING the first four months of this year, exports of the nation's metalworking industry were a whopping 63.6 per cent above those of the same period in 1956. Total exports showed a substantial 28 per cent gain.

Here's how the situation stacks up: So far this year, total exports have poured $7.2 billion into the nation's economy, with metalworking accounting for half that sum. If the rate continues, look for exports to exceed $20 billion this year. The all-time high ($19 billion) was set last year.

Metalworking exports come to $3.6 billion, compared with $2.2 billion in the first four months of 1956.

Slight Dip—At $1.8 billion, April was 13 per cent down from March but 23 per cent higher than April, 1956. A drop in April shipments of passenger cars, trucks and busses brought the machinery and vehicle figure to $651.5 million. March shipments were worth $730.8 million.

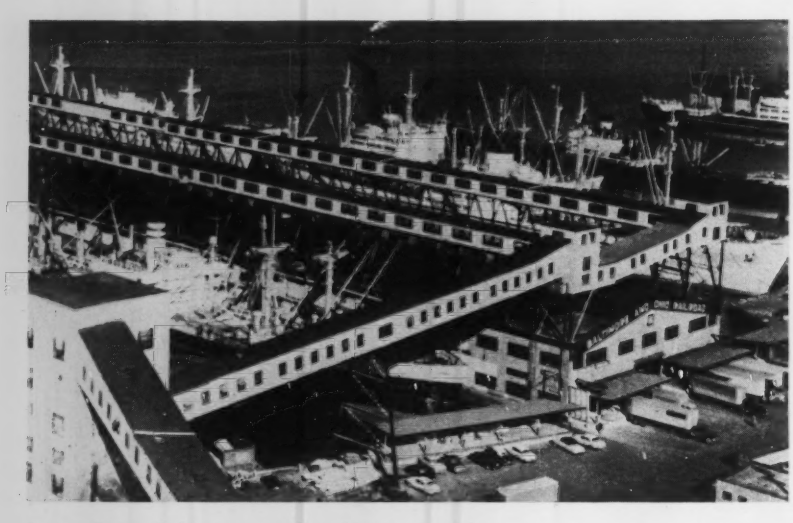
Metals and manufacturing fell to $225.7 million in April after hitting $258.1 million the preceding month. Reasons: Reduced shipments of copper (scrap, ore and concentrates), steel and steel scrap.

Factors—Because of the Suez crisis, oil shipments contributed to the over-all increase. The tight fuel situation, in turn, reduced production in the UK and Western Europe and boosted purchases of metal products from the U.S.

Export — The Export-Import Bank has made some sizeable loans in Europe and South America for the modernization of railroads, including rolling stock. They, of course, show up in metalworking exports.

Substantial amounts of private capital have gone abroad as loans and investments. They are raising the standard of living in many areas of the Free World and increasing the demand for such things as U.S. home appliances, office equipment, agricultural and other types of machinery.

Foreign Aid—The possibility



Locust Point, Baltimore, typifies shipping activity

that foreign aid may be reduced is seen as causing some countries to update orders for fear that funds may not be available next year.

In fiscal 1956-57 (which ends June 30), the U.S. disbursed these outright grants, loans and credits:

Asia: Military aid, $2 billion; nonmilitary aid, $303 million.

Near East and Africa: Military aid, $642 million; nonmilitary aid, $242 million.

Europe: Military aid, $839 million; nonmilitary aid, $12 million.

Latin America: Military aid, $35 million; nonmilitary aid, $61 million.

Round Trip—Much of that money ($4.1 billion) has returned to the U.S. to pay for exports. Another $782 million in foreign aid funds remains for "emergency use" in this fiscal year.

In March, $115.9 million worth of aircraft parts and accessories were exported, compared with $73.4 million in March, 1956. March exports of railway transportation equipment were valued at $13 million, double the $6.4 million figure in the same month last year.

Big Stuff—Total exports to Western Europe jumped from $474.5 million in March, 1956, to $765 million in March this year. They included what the Department of Commerce classifies as special categories: Artillery and ammunition lathes, shell tappers, rifling and rifle working machines, tanks and fire control equipment, water craft, bridges, gun and aerial cameras.

Outlook—The increase is accounted for chiefly by heavy equipment. With the exception of drops here and there, other phases of the metalworking industry appear to be holding their own.

The opening up of new independent areas, especially in North Africa, is expected to help the demand for agricultural and road building machinery, railroad equipment, plant and manufacturing machinery.

Future Warehouses

Systems engineered and balanced material handling to replace storage, says expert

AUTOMATED WAREHOUSES of the future will be neither fully automatic nor houses in which wares are stored, in the opinion of Allan Harvey, vice president and general manager of Dasol Corp., New York.

Speaking before the American Management Association's Factory of the Future conference in Cleveland, Mr. Harvey described savings up to 60 per cent from "engineered systems."

Integrated—"The warehouse of the future will be systems engineered material handling," he said. "It will be tied in with production and sales and will provide continuous handling of the product from the time it is manufactured until it is shipped to the buyer.

"This will eliminate need for large storage space. Electronic computers will make all minor decisions. Controlled equipment will bring the product to the worker. The 'do time' of workers will be increased to approach 100 per cent."

Challenge—Mr. Harvey termed the automated warehouse a challenge to management to reduce costs. "The warehouse of the future will be a product of systems engineering with emphasis on balanced flow," he said.

Many present day installations are saving hundreds of thousands of dollars each year in reduced storage space and increased worker time, he said.

Threefold—Nicholas Marchak, director of research and engineering, Sun Tube Corp., Hillside, N. J., told the conference: "Any business operates to satisfy three factions, the stockholder, the employee and the customer."

Mr. Marchak told how his firm, manufacturers of collapsible tubes for such products as dentifrices and shaving cream, undertook research to find some means of meeting rising competition.

Solution—"In today's market with costs and materials going up, wages and customer demands increasing, we have tried to find a means of maintaining our earning power so that we could continue to satisfy our stockholders, our employees and also to continue to give our customers the best of service," he said.

"The results of automation have benefited production, the employee, the customer and also earnings," Mr. Marchak continued. "In this way we have fulfilled the principles of business to which we are dedicated. Production has increased about 25 per cent. The employee has benefited by the elimination of tedious duties as well as by expansion which will lead to more jobs. The customer has benefited by increased production capabilities and our ability to handle larger runs and rush orders."

Middle Managers Win Raise

They're being paid 5.8 per cent more than they were a year ago, AMA survey finds. Nearly half receive bonuses. U.S. rate 20 per cent above Canadian

MEN IN middle management are earning 5.8 per cent more than they did last year, reveals an American Management Association survey.

It covers over 6000 employees from the policymaking to the lower supervisory levels in 239 companies in the U.S. and Canada.

Merit — Three-fourths received salary increases last year. Reasons for them:

- One-half were on merit.
- One-fourth were general company increases.
- Seven per cent were the result of promotions.
- The rest were combinations of above reasons.

Canadian companies pay middle management 20 per cent less than American firms do. The difference is least for sales and production executives.

Variance — In small American companies, middle manager salaries range from about $6000 to $15,000 a year; larger companies pay as high as $30,000. Factors other than company size have an influence. For example, the pay of a plant manager often is tied to the production volume of his plant, that of a district sales manager to the sales volume in his area. Location seems to play no part.

Rewards — Forty-five per cent are paid bonuses. Manufacturing and marketing executives tend to receive the largest.

All Work, No Play

Industrial recreation is a relatively new employee relations program, confined mainly to bowling alleys and baseball sandlots. But, already it needs a new look—something that will attract middle to top management, in the opinion of Robert W. Galvin, president of Motorola Inc., Chicago.

What's needed, said Mr. Galvin, is an organized, disciplined program—winter and summer—to exercise flabby muscles and tired minds.

Tie-in—He reasons: Middle management is generally interested in self-improvement. Why not tie recreation in with training programs? The subtle objective: Improving the individual's salary.

Active sports programs are only part of Mr. Galvin's plan. He suggested lectures, panel participation programs, seminars on the arts and sciences, classical music, artistry, sculpture, hobbies, "Great Books" courses and investment clubs.

All-Out Marketing

NIAA takes a new look at selling functions and calls for integration of all phases

WE are in a new era of marketing which demands closer integration of all selling functions—advertising, sales promotion, public relations, sales, market research and product development (see page 93).

The industrial advertising man of the 1960s and 1970s will concentrate on planning, co-ordination, liaison and interpretation of marketing objectives rather than copywriting skills and production know-how, in the opinion of Richard C. Sickler.

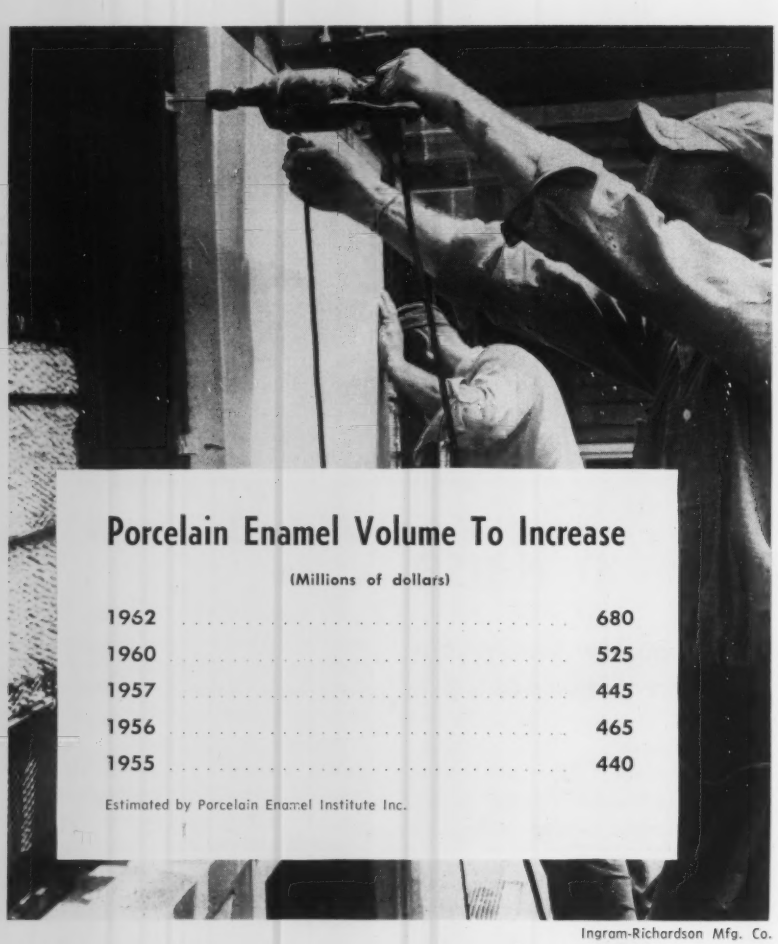
Agreed — Mr. Sickler, product group manager, product advertising, E. I. du Pont de Nemours & Co., Wilmington, Del., is the new chairman of the National Industrial Advertisers Association. He and other speakers at the NIAA conference in New York last week were pretty much of the same mind.

They also believe that agencies must begin to solve over-all marketing problems.

Research — Closely allied with marketing ("orienting your entire business to the customer," as Robert L. Gibson, vice president, General Electric, defined it) is the development of new products. Almost 90 per cent of all new products fail within four years, Dr. C. Wilson Randle, partner of Booz, Allen & Hamilton, national management consultant firm, said.

"The importance of new products in the life and growth of companies," he added, "is demonstrated by the fact that some $7 billion is being spent in 1957 on research and development." For many companies, products introduced since World War II account for half their sales.

The new NIAA vice chairman is Robert C. Myers, director of market development, U.S. Steel Corp., Pittsburgh.



Porcelain Enamel Volume To Increase

(Millions of dollars)

1962	680
1960	525
1957	445
1956	465
1955	440

Estimated by Porcelain Enamel Institute Inc.

Ingram-Richardson Mfg. Co.

Buildings Boost Enameling

Industry heads see good future for this product despite possible decrease in appliance volume. Reason: Growth in popularity of enameled sheets for construction uses

THE PORCELAIN ENAMEL industry looks forward to a substantial increase in business in the next five years, even though there are prospects of a slight dip in volume in 1957.

"Architectural uses of the product have probably the best future growth potential, with possible exception of appliances," reports the Porcelain Enamel Institute Inc., Washington. "Thanks," they say, "are due to the popularity of curtain-wall construction." (About two-thirds of porcelain enamel output still finds application in appliances.)

Among other uses of the product: Plumbing fixtures, industrial equipment, signs and general enameling. While they and appliances account for slightly over 70 per cent of the tonnage, buildings are grabbing the headlines.

1957 Sales—The association estimates dollar volume this year at $445 million—$20 million less than last year. Reason: The present slump in ranges and ironers. Other appliances are reported to be on the increase.

A sales manager for an enameling sheet mill adds: "Appliances still are the major part of our market, but demand from that source slowed this year. In contrast, construction uses are booming. In architecture, enameling panels offer the strength of steel and unlimited range of permanent color. Color also helps sell appliances, although colored appliances make up only 5 per cent of the total. Distributors use color in intriguing ways in their showrooms to catch the potential buyer's eye."

Many Structures—"The success of enameled panels comes from their use in numerous buildings of modest proportions, rather than the few monumental structures which make the headlines," market development personnel at U.S. Steel Corp. point out. "For example, schools in rapidly growing population centers choose the panels because they can be quickly erected as the school expands and are free from maintenance difficulties."

J. F. Ingram, president of Ingram-Richardson Mfg. Co., Beaver Falls, Pa., reports: "Current building plans show a definite trend toward larger porcelain enamel panels. It's possible now, with proper design, to produce 6 x 10 ft panels in one piece. Big panels cut costs because they require less framing. With less calking or gasketing required, there's also less danger of weather damage."

Ingram-Richardson adds that it supplied what it says to be the two largest one-piece porcelain enamel panels ever installed—one 4 x 12 ft for U.S. Steel's Homestead District Works at Munhall, Pa., and one 7 ft 10 in. x 3 ft 3 in. for Radio Corp. of America at Cherry Hill, near Camden, N. J.

Less Heat — Fritmakers are doing intensive research to improve the enamel baking process. At least one major steel producer is firing "low-temperature" frit onto cold finished steel at 1300°F for architectural applications. Generally, frit is fired onto enameling sheet at 1500 to 1600°F. Frit

manufacturers are experimenting with a product which could be applied to standard carbon steel at 1050°F.

A trend to the use of cold finished steel would help frit-makers, in the opinion of one of the five major frit producers. A spokesman says: "Development of low-temperature frits would mean lower cost to the user through increased use of lighter gage steel. It would give our market that much more strength. Porcelain enamel buildings will grow in popularity."

Far from Complete—Work on low-temperature frits is largely experimental. One steelmaker says: "Some of the difficulties involved in lower-temperature applications are higher-cost frit, longer firing time, furnace modifications and poorer surface quality. Commercial success in this direction is at least five years away, but at that time, porcelain enameled, cold rolled steel could replace baked enamels in many applications."

Standard Installs Electric

The first electric furnace at the Standard Steel Works Division, Baldwin - Lima - Hamilton Corp., Burnham, Pa., will be installed in July. A 15-ton Lectromelt, it will melt stainless, bearing quality and superalloy steels which the company formerly purchased as conditioned blooms.

The $200,000 furnace will add about 17,000 tons to the plant's present 170,000-ton ingot capacity (five acid open hearths and one small crucible furnace). It is part of a $2-million expansion program which includes a new substation and seven heat treating furnaces.

GE Markets Lighter Motors

General Electric Co., Schenectady, N. Y., anticipates 75 per cent greater demand for its Tri-Clad 55, alternating current, induction motors by 1965. Proof of its confidence: GE has spent $11 million to develop the line and expand production facilities.

These motors are 20 per cent lighter and 27 per cent smaller than previous models.

Army Gets Light Engines

Continental develops a family of six for Army to replace complex of 78 models. Value of standardization outweighs higher cost. Other services may follow suit

A SERIES of six, air-cooled gasoline engines is being developed for the Army by Continental Motors Corp., Muskegon, Mich.

The four-cycle, overhead-valve units range from ½ to 20 hp. They will replace 78 types of small engines used by the Army, say L. D. Bakke, Continental engineer, and R. F. Dennis, engineer for the Army's research and development laboratories.

Time—Test models will be available in July. Quantity production of the three smaller sizes is scheduled for January, 1958. Output of larger types won't start until the following year.

The engines will drive air compressors, sprayers, pumps, mixers and heaters. They are designed to operate in all climates. Continuous horsepower rating is 57 per cent of the maximum rated horsepower, providing a large reserve.

Advantages — Reduction in weight, maximum interchangeability of parts and easy repair are looked for by the Army in this new program. Parts for maintenance and servicing will be reduced from 23,000 to 800.

Only 28 line repair items will be stocked to service the three smaller models.

Long Life—"Design life between major overhauls is 1500 hours, compared with 500 and 1000 hours in commercial engines now used by the Army," Messrs. Bakke and Dennis told members of the Society of Automotive Engineers.

Lightness is achieved by using 14 die-cast aluminum parts which are interchangeable on most of the engines. Together, these parts weigh only 13 lb.

Cost—"Although the engines cost approximately 10 per cent more than their militarized commercial counterparts, the value of overhead valves and standardized parts more than make up the difference," say the engineers.

The Army is the only service which has adopted the industrial family engine concept. The Air Force has a similar program for vehicular engines.

Prospects are this family group will be adopted by the Defense department. The Air Force and Navy have given it informal acceptance.

Army Engine Spec Sheet

CONTINUOUS RATING (hp)	RATED SPEED (rpm)	OPERATING SPEED RANGE (rpm)	DISPLACEMENT (cu in.)	NO. OF CYLINDERS	APPROXIMATE WEIGHT (lb)
½	3600	2600/4000	3.00	1	15
1½	3600	2600/4000	7.95	1	25
3	3600	2600/4000	15.90	2	40
6	3600	2000/4000	31.80	4	70
10	3600	2000/4000	42.40	2	90
20	3600	2000/4000	84.80	4	175

Lone Star Boat Co.

Boating Boosts Aluminum

National economy willing, aluminum pleasure craft builders are heading for record sales in 1957 and 1958. Poll by STEEL shows sales in 1956 were above 1955's

THE PLEASURE boat craze is building an important new market for aluminum.

Contends the Aluminum Co. of America, Pittsburgh: "Some 16 million lb will be consumed by the pleasure boat industry in 1957. One out of every three boats features aluminum construction. Seventy-five per cent of all pleasure craft have aluminum hardware, trim or accessories." Sidelight: Outboard motor applications will increase use of the metal by at least 22 million lb, estimates Alcoa.

Observations — Makers agree that the demand for pleasure boats will increase 10 to 15 per cent annually as long as: 1. The national economy and personal incomes stay at present levels or go higher. 2. People continue to have more leisure time.

Every boatmaker queried by STEEL reported that sales in 1956 exceeded 1955's. Samples:

- Viking Boat Co., Middlebury, Ind.: Up 30 per cent.
- Lone Star Boat Co., Grand Prairie, Tex.: Up 55 per cent. (This year's totals are running 20 to 25 per cent ahead of 1956's.)
- Southwest Mfg. Co., Little Rock, Ark.: Up 30 per cent. (1957 sales are about 20 per cent ahead of those in the same 1956 periods.)
- Duratech Mfg. Corp., Pleasantville, N. Y.: Up 20 per cent.
- Aluma Craft Boat Co., division of Flour City Ornamental Iron Co., Minneapolis: Up 26 per cent. (This year's results are some 10 per cent ahead of last year's.)

Prices — You can purchase an aluminum canoe (15 ft) for about $250. You can get a cabin cruiser for $2500.

Salt Vs. Fresh Water—Corrosion is no problem in fresh water so long as contaminating industrial wastes are absent. Makers of aluminum craft have licked the salt water problem, too. Reports Fred J. Venner, president, Southwest Mfg. Co.: "When the proper alloys are used, aluminum can be put in service in salt water as well as fresh. Salt water does etch the aluminum to some extent, but does not injure the boat."

Competition—Makers of aluminum boats have been trying to overtake wood boat competition for ten years. Trends indicate that glass fiber and steel boats are offering added competition. Some producers who started with aluminum exclusively have added the glass fiber type. Roy E. Hughes, general sales manager, Lone Star Boat Co., explains: "Besides aluminum, we use glass fiber for boats, steel in our boat trailers. At this time we are using about the same share of glass fiber in comparision with previous years, but our use of glass will grow faster percentagewise (not in total tonnage) than aluminum."

Air Reduction in Chicago Plant

Air Reduction Co. Inc. has opened a new air separation plant in the Lake Calumet section of Chicago.

Built at a cost of more than $7.5 million, the facility will produce 55 tons of high purity liquid oxygen, 15 tons of liquid nitrogen and 3½-tons of liquid argon daily. Pushbutton controls permit operation of the plant with a staff of 20. A group of 30 employees handles distribution activities.

The firm operates similar plants at Butler, Pa., and Riverton, N.J., and has additional facilities under construction at Acton, Mass., and Los Angeles.

Job Shop Uses Computers

Production scheduling will be done by computer in Alcoa's foundry and forge shop at Cleveland. Equipment will make 138,000 logical decisions a minute

ONE REEL of magnetic tape used by the electronic computer installed this month at Aluminum Co. of America's Cleveland Works will store as much information as 57,000 IBM tabulating cards.

Officials of International Business Machines Corp., New York, say the system (an IBM 650 computer) is the first of its kind to be used by a jobbing shop for production scheduling.

More Uses—It'll do all the plant's statistical clerical work, eliminating duplication and providing all departments quick access to information on production, inventory, costs and payroll.

First job: The machine will plan production by anticipating man and machine requirements, based on the number of open orders on hand. A. W. Potts, administrator of the data processing department which operates the new unit, says: "We're tackling the big, difficult assignment first."

How It's Done—The machine will compare standard practice information (on tape) with the requirements of incoming sales orders fed in on IBM cards. It then will be able to tell when each operation in the shop should be started. Delivery dates can be determined in a minute.

Normally, an order will be started in the shop about two days after it is received. It used to take about a week.

Other Advantages — Capacity will be expressed in terms of man and machine hours instead of less helpful tonnage figures. Bottlenecks will be foreseen in time to act, and order acceptance dates will be more realistic.

Daily reports on work in process will be made, and costs of jobs can be compared with standards on a day-to-day basis.

The Computer—The system will use three types of magnetic storage information:

1. A magnetic drum which is part of the central processing unit.
2. Magnetic tape storage (capable of storing the greatest volume of information).
3. Magnetic core storage—its value is the speed with which it can pick out and make available specific types of information which have been stored on tapes.

A large number of facts is stored in the machine's "memory." It will give information, provide yes and no decisions to a problem, compute, sort, store, summarize data and even supply managers with printed answers.

Speedy—In 1 minute the machine will make 78,000 additions or subtractions, 5000 multiplications or 3700 divisions.

Information can be entered or taken from the system on magnetic tape at the rate of 900,000 digits a minute.

Tabulating cards can feed the system 16,000 digits a minute. It, in turn, will punch cards at the rate of 18,000 characters a minute.

Computing equipment worth about million is rented for $12,500 a month

Electronics Gains

Defense department spending to hit $3.5 billion this fiscal year, up 25 per cent, RETMA says

ELECTRONICS expenditures by the Defense department increased substantially in the third quarter of fiscal 1957, the Radio-Electronics-Television Manufacturers Association estimates.

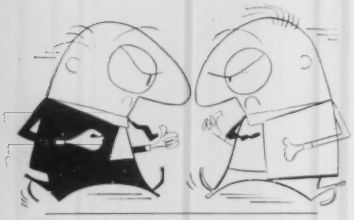
Should the present level continue, military spending for electronics this fiscal year should be about $3.5 billion. (Fiscal 1956 expenditures: $2.8 billion.)

Mounting—RETMA places spending in the first three quarters of fiscal 1957 at nearly $2.5 billion. The outlay for the similar period last year was $1.983 billion.

Third quarter spending totaled $952 million, compared with $894 million in the second quarter and $646 million in the first. The total since 1951 is almost $19 billion.

Missiles Soar — Spending for guided missiles increased the most, climbing from $205 million in the first quarter to $311 million in the third. The outlay for aircraft electronic equipment dropped from $270 million during the second quarter to an estimated $258 million in the third.

Electronic equipment expenditures for research and development are on a gradual upward trend. The expected total for the first three quarters is $221 million.



Economic Forecasters Disagree; Tax Relief Hopes Grow Dim

WASHINGTON is the place to be these days if you're of a mind to try your hand at economic planning or forecasting. In the last two weeks, the Machinery & Allied Products Institute and the AFL-CIO's Industrial Relations Conference met here while the Joint Economic Committee has been hard at work on the hill and gathering special data from the Bureau of Labor Statistics.

Everyone said his piece and left town. Washington will recover from the oratory (as it always does), but it will be a while before we make sense out of the conflicting views. For example:

Management—MAPI's research director, George Terborgh, says industry is dragging its feet on the road to industrial progress because the 52 per cent corporate tax rate actually amounts to 60 per cent when the true cost of inventory and fixed asset consumption is considered. So the normal life of machines and other industrial equipment is extended by about 20 per cent—until they are decrepit enough to make it economical to replace them.

Labor—Stanley H. Ruttenberg, director of research, AFL-CIO, thinks the role of capital expenditures is overrated. To promote steady economic growth, we must put more emphasis on consumer expenditures, he says. The growing productivity of capital, Mr. Ruttenberg believes, lessens the need for boosting capital expenditures.

Government—Nicely in between the two views, you find the Bureau of Labor Statistics. Real earnings of the nonagricultural employee have climbed almost 33 per cent since 1947, says the bureau, if you include employers' contributions for Social Security and private supplemental funds. The output per employee in the same period has gone up slightly less—about 26 per cent.

Unit labor costs rose 27 to 28 per cent during the ten-year period. Nonlabor costs and prices gained about the same. Those statistics indicate that the economic rate of progression is proceeding on a fairly even keel: Wages (which form the base of consumer expenditures) are rising at a similar rate to productivity (which is the result of capital expenditures).

Clue—Political realities will dictate the congressional view of these opinions. A clue is to be found in Rep. Wilbur Mills' (Dem., Ark.) conduct of the Joint Economic Committee hearings: At the close of each session, he asks each witness whether he believes tax cuts this year would be inflationary. That's a tough question for an economist to answer; it's nice to be able to hedge a little. But Representative Mills, like a criminal lawyer, demands a straight "yes" or "no."

Consensus: Yes. Outlook: A tax cut in 1958 will have rough going.

U.S. Tools on the Block?

Legislation proposed by the Defense department would allow it to "sell without advertising any industrial facility, including related machine tools and production equipment" which are now under its control. This would include property needed to fulfill mobilization requirements which could "if privately owned, be maintained in a condition that would make it available for the production of supplies needed by the armed forces."

The proposed legislation has been given to the Bureau of the Budget for approval and is circulating among affected agencies.

Drastic Change—Present procedure for the disposal of surplus U.S. property calls for approval by each of the agencies and departments which might have use for it. Sales must be advertised. The change Defense wants would apply to property not now labeled surplus and would open the department to charges of "giveaway," observers say.

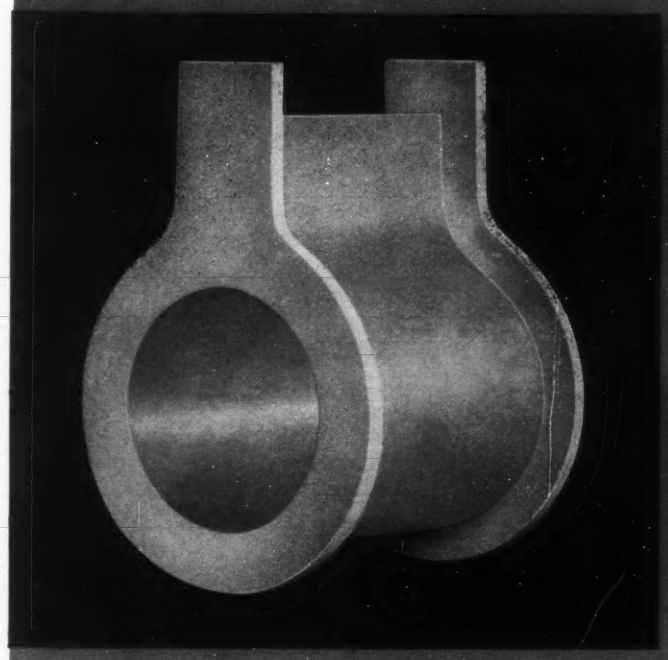
The change could mean: 1. Defense might sell to private industry equipment needed by another agency. 2. Dissipation of the mobilization base by wear and tear on equipment placed in private industry. 3. Loss of control of the mobilization base by ODM. 4. Advantage to big firms which now hold much of the equipment, by not allowing other firms, including small business to bid for it. 5. Flooding the machine tool market with used equipment. 6. Secret deals between Defense and its suppliers.

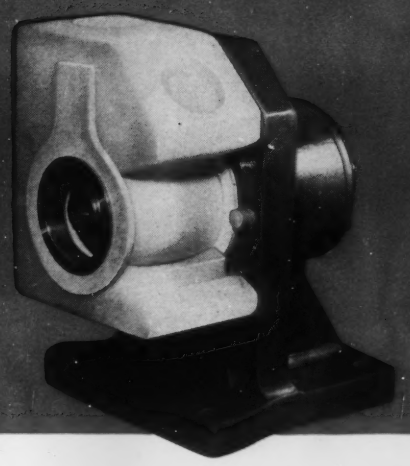
Outlook—Defense backs up its proposal by noting that increased revenue would come to the Treasury department through taxes on the privately owned property, as well as through money gained from the sale.

This will appeal to the economy-minded Congress. But, there is the chance that the legislation won't get to Congress because affected agencies reportedly will fight it right down to the wire.

Put this down as: 1. Another power play by Defense to control the mobilization effort. 2. Symptomatic of the Air Force's importance in Defense's policy formation. (AF views a production mobilization base as unnecessary on the assumption of a 30 to 60-day thermonuclear war.)

PUMPS FUMING NITRIC ACID 14.7 MILLION CYCLES





...and the Heart of this Vanton Pump is C/R Sirvene

Vanton Pump engineers knew what they wanted—a flexible liner for their unique Flex-I-Liner pump that would permit the handling of red and white fuming nitric acid, hydrogen peroxide and other strong oxidizing agents. In addition, high flexibility had to be combined with positive sealing efficiency to protect the rotor, shaft and bearing from contact with the corrosive chemicals. For almost six years Vanton engineers tested various liners and found none that could withstand these unusually severe specifications. Then they turned the problem over to C/R Sirvene engineers. They got the liner they wanted in a matter of weeks. C/R's Sirvene liner, based on the Kel-F elastomer, meets every specification and has been performing dependably for as long as 14.7 million cycles.

If you have a sealing problem—equally critical or simple—C/R Sirvene engineers can help you. They're recognized leaders in the compounding and molding of elastomers for fluid sealing and related applications. They have the research and facilities to solve your problem quickly and economically. Write them direct—or send for the informative new booklet, "Sirvene."

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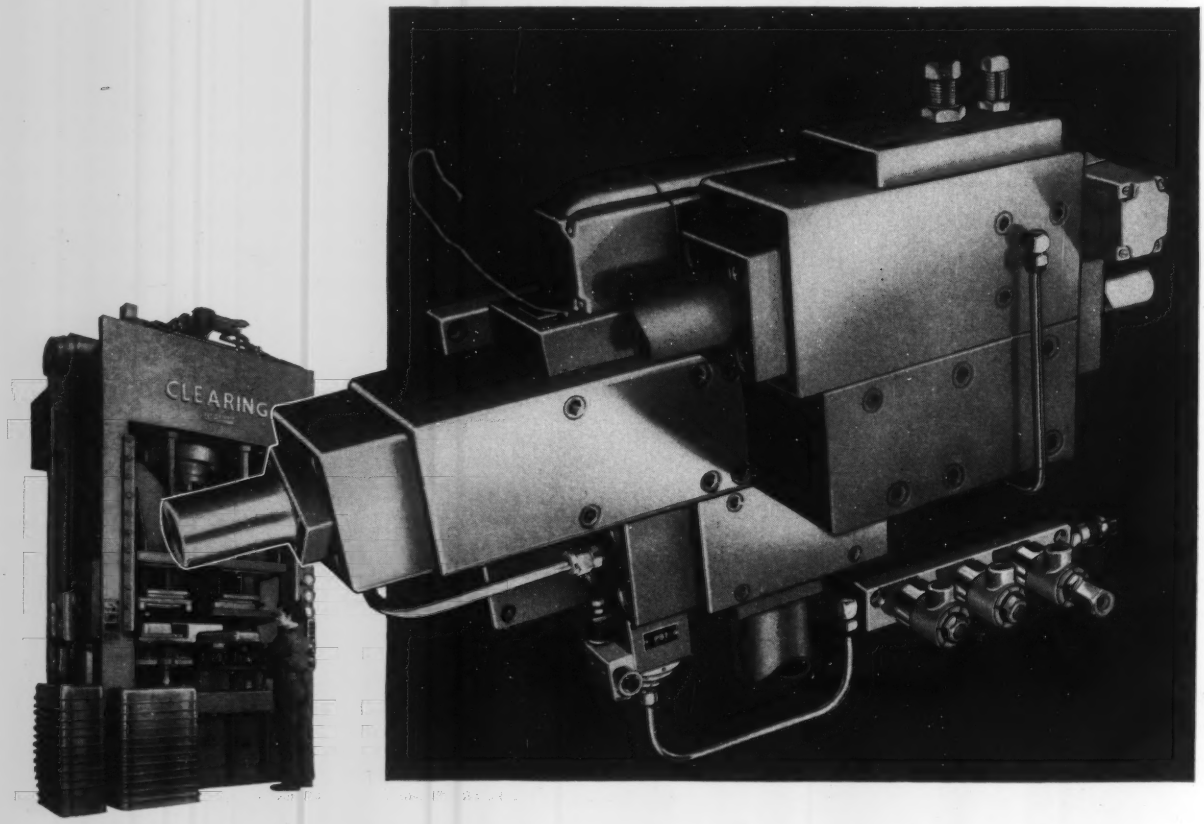
C/R Shaft and End Face Seals • Sirvis-Conpor mechanical leather cups, packings, boots • C/R Non-metallic Gears



The heart of steel that can step up the pulse of your drawing operations

To paraphrase Hamlet, *the thousand natural shocks that a press*—a hydraulic press, that is —*is heir to*, raises havoc with pipe joints and valve connections. That's why Clearing engineers designed the compact operating valve shown above.

In this solid steel unit all operating valves are manifolded, reducing the amount of intervalve piping. Valve bodies are machined from forged steel and all chambers and ports are bored from solid. The unit is firmly mounted to the oil reservoir, thus simplifying inspection and servicing. Valve bodies and spools are free to move under all conditions without binding.

If your production requires hydraulic presses, investigate Clearing hydraulics. Find out about the new high speed approach and return stroke cycles that step up production rates. Find out about the remarkable tonnage and stroke controls. Complete information on Clearing Hydraulics is yours for the asking.

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Job Shop Sells by Design

Northern Malleable Iron's sales engineers keep the foundry's sales and backlogs above industry averages by ferreting out new applications for castings

PEOPLE at Northern Malleable Iron Co., St. Paul, affectionately refer to the four sales engineers pictured below as "junk men."

They are the sales force of Northern Malleable, which employs about 135 production men in its foundry operations.

"The 'junk men' tag," explains President George Boli, "stems from the fact that each returns from a sales trip loaded with parts and components which represent potential orders for us—new business."

Objective—The part the men are studying is a hitch, made as a weldment. Their objective: To produce a better one at lower cost as a malleable casting.

The sales engineer is Northern Malleable's answer to the eternal problems of most job shop manufacturers and the foundry industry in particular: Competition from large firms with captive shops, price cutting, competing methods and materials.

Philosophy—"Nobody gains by price cutting," says Mr. Boli. "Our philosophy is that new applications for malleable and pearlitic castings are the only solution to keep our company and industry growing. With 60 per cent of our work in the agricultural implement field, we'd have been in a serious position if we hadn't started using sales engineers."

Take a look at Northern Malleable's record for 1956. It brought in 388 new jobs. Of these, 210 represented newly designed parts worked out by the customer or Northern Malleable's sales engineers. The rest involved conversion from other forms of fabrication or metals.

Service—"The objective of our approach," says Mr. Boli, "is to provide engineering service for our customers. Many components being made today are not malleable or pearlitic castings but should be because of strength, design and cost factors. It's the sales engineer's job to ferret those out and then present proof to the customer."

Three of the company's sales team have engineering degrees. They started with the firm on graduation from college. At the outset, each worked a minimum of six months in the foundry. The fourth member has no degree, but spent seven years in the pattern shop. He has displayed a definite affinity for design engineering.

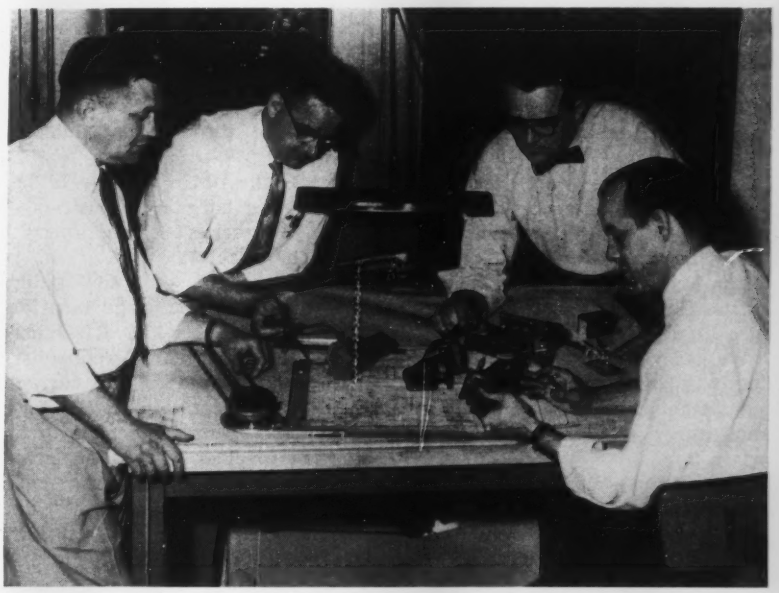
Refresher Course—Training of the team didn't stop with a brief stint in the foundry. Mr. Boli tries to keep one there at all times—usually rotating the men every four months. One of their jobs is to follow through on customer complaints. "It's there that they learn not only what can be done in a foundry, but what cannot."

Additional training includes working with the advertising agency in preparing sales literature and advertising campaigns.

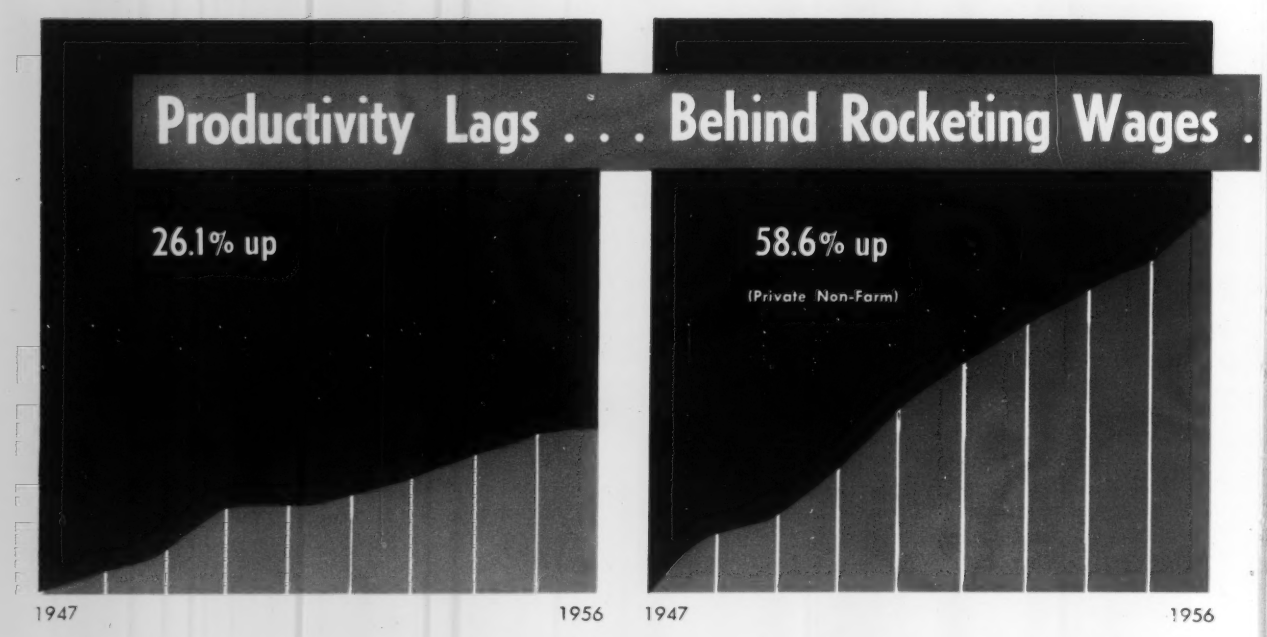
Trends—Two definite trends have been noted by Northern Malleable as it has gained experience with sales engineers:

1. Half of all "first jobs" for new customers result shortly in one or more additional orders.
2. As customer confidence in the company and the sales engineer builds up, more and more orders come directly from drawing boards rather than as conversions of parts in production. "Many of our customers now ask our sales engineers to sit in on their design conferences to make sure they're getting the most effective use of castings in their products," Mr. Boli points out.

The short-term payoff of Northern Malleable's sales engineer approach is readily apparent: It's one of the few foundries in the nation still working a 5½-day week with a two-month backlog. There is a long-term objective, too: These young men are candiates for top management spots.



The part: A hitch. The problem: How can it be made as a casting? The problem solvers (left to right): John Entenmann, John Heitkamp, Donald Fulton, Thomas Kirby, sales engineers at Northern Malleable



Is Wage Inflation at Fault?

Some economists say "yes" and forecast no end to price spiral so long as labor's productivity fails to match wage demands. Clague puts blame elsewhere

ECONOMISTS detect a new species of dollar depreciation: Wage inflation.

The symptoms were described by Ewan Clague, commissioner of statistics for the Department of Labor, before a New York session of the Economic Forum, sponsored by the National Industrial Conference Board (NICB).

We had virtually no gain in productivity last year, he reported, but a significant rise in labor costs and an accompanying rise in prices.

The Thing—While productivity rose by 3.5 per cent annually from 1947 to 1956, employment costs during the period increased by about 5 per cent each year. Result: Wage inflation.

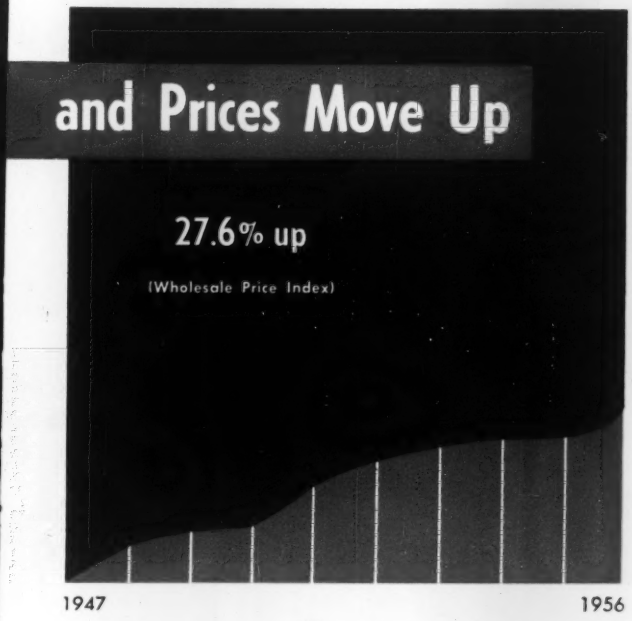
It came as a consequence of union demands, management concessions and the addition of costs incurred to the price of finished goods.

It was inevitable because of labor's strong bargaining position—there just weren't enough people to do the work.

Unprecedented — Emphasizing differences between wage inflation and historic types, M. R. Gainsbrugh, NICB's chief economist, made these points: "The current inflation has gone on in the face of a tight monetary policy. It was not touched off by speculative fever or by a stock market or land or commodity boom, as in the past. It was accompanied by a shrinkage rather than an expansion of profit margins. Consumer stocks were high rather than depleted by wartime scarcity or rationing. Our defense outlays were no greater than in the years of price stability immediately preceding. Finally, several pivotal wage increases came before rather than after price increases. In past inflations, prices moved upward first and wage rates lagged."

Another forum participant, G. P. Hitchings, manager of Ford Motor Co.'s Economic Analysis Department, declared flatly that higher payroll costs have been the generating factor in the price rise for consumer goods and services since mid-1955. "This is borne out by examination of the money supply increase and the demand for consumer goods relative to supply," he said. "The money supply has increased only 1.8 per cent from June, 1955, to November, 1956, on a seasonally adjusted basis, and there is no excess consumer demand. The increase in payroll costs for manufacturing in 1956 has been due to higher average hourly earnings, which have increased 10 per cent since mid-1955. An increase of this magnitude could not be absorbed through an increase in productivity."

Trouble Ahead—A. D. H. Kaplan, of the Brookings Institution,



observed that the percentage of increase in the wholesale price index in the past decade has been about the same as the difference between the increase in wage rates and the increase in labor output per hour. He concluded: "When wages are moving ahead of productivity, the economy is being weakened and is headed for a showdown in resistance to further savings and investment."

Big increases year after year in the costs of industrial production must be reflected in prices or in unemployment, warned B. B. Smith, economist for U.S. Steel Corp. "We are going to go on and see our dollar steadily depreciating, or we are going to have a lot of unemployment, or we are going to curb the abuse of labor monopoly power."

Uncle Sam—Divergent opinions of the government's role in checking inflation were expressed by three professors of economics—Solomon Fabricant and Jules Backman of New York University and O. G. Saxon of Yale. In Mr. Fabricant's view, government has no responsibility to "bail out" excessive wage increases. While it can hardly maintain a monetary policy which would lead to extensive unemployment, government should take measures which would lead to "little bits" of unemployment in those areas where wages and prices have become extreme, he declared.

Mr. Backman asserted that management has a responsibility to fight against excessive increases in labor costs and that government has a responsibility not to intervene.

Said Mr. Saxon: "The time has come, and long since passed, when we need legislation at the federal level to correct the present situation (an imbalance in the bargaining process)."

Questions Theory — While the consensus of the forum was that wage rate increases have caused prices to move up, Mr. Clague questions this interpretation. A Bureau of Labor Statistics report prepared under his direction for the Senate-House Joint Economic Committee cautions: "Prices are subject to numerous influences of changing market conditions and costs of production, and a change in price cannot be explained by reference to any single factor, even one as large as labor costs."

To Mr. Clague, the relevant factor in studying the relationship between earnings and prices is not average hourly compensation but unit labor costs. He points out that although wages went up 58.6 per cent from 1947 to 1956, unit labor costs rose only 28 per cent. This increase is hardly more than the productivity gain for the period (26.1 per cent) and was necessary to offset a 27.6 per cent increase in the wholesale price index.

Blames Prices—On the issue of which came first, higher costs or higher prices, Mr. Clague reports that labor costs followed prices uphill during most of the postwar years. In 1949 and 1950, unit labor costs actually declined to 104.6 (1947 = 100) from their 1948 level of 106. But prices moved up from 106.5 in 1948 to 107.7 in 1949, and 108.9 in 1950. So prices were rising in those years while unit costs dropped a bit.

Only 1956 should be described as a year of wage inflation, says Mr. Clague. While productivity stood still, average hourly compensation and unit labor costs both climbed 4.5 per cent.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Audio-Visual Sales High

Americans are spending $180 million a year for audio-visual (sound movie projectors and TV sets) equipment, says John Flory, adviser on nontheatrical films, Eastman Kodak Co., Rochester, N. Y. Since World War II, he estimated, $1.5 billion has been spent for this sort of equipment.

Mr. Flory addressed the 81st convention of the Society of Motion Picture & Television Engineers in Washington. He told them:

U.S. firms own and operate 150,000 16-mm sound movie projectors, representing an investment of $156 million. The U.S. government has spent $31 million for equipment and film; schools, $22 million; churches and religious organizations, $13.9 million; social welfare agencies, $7.5 million; and hospitals and health clinics, $5.7 million.

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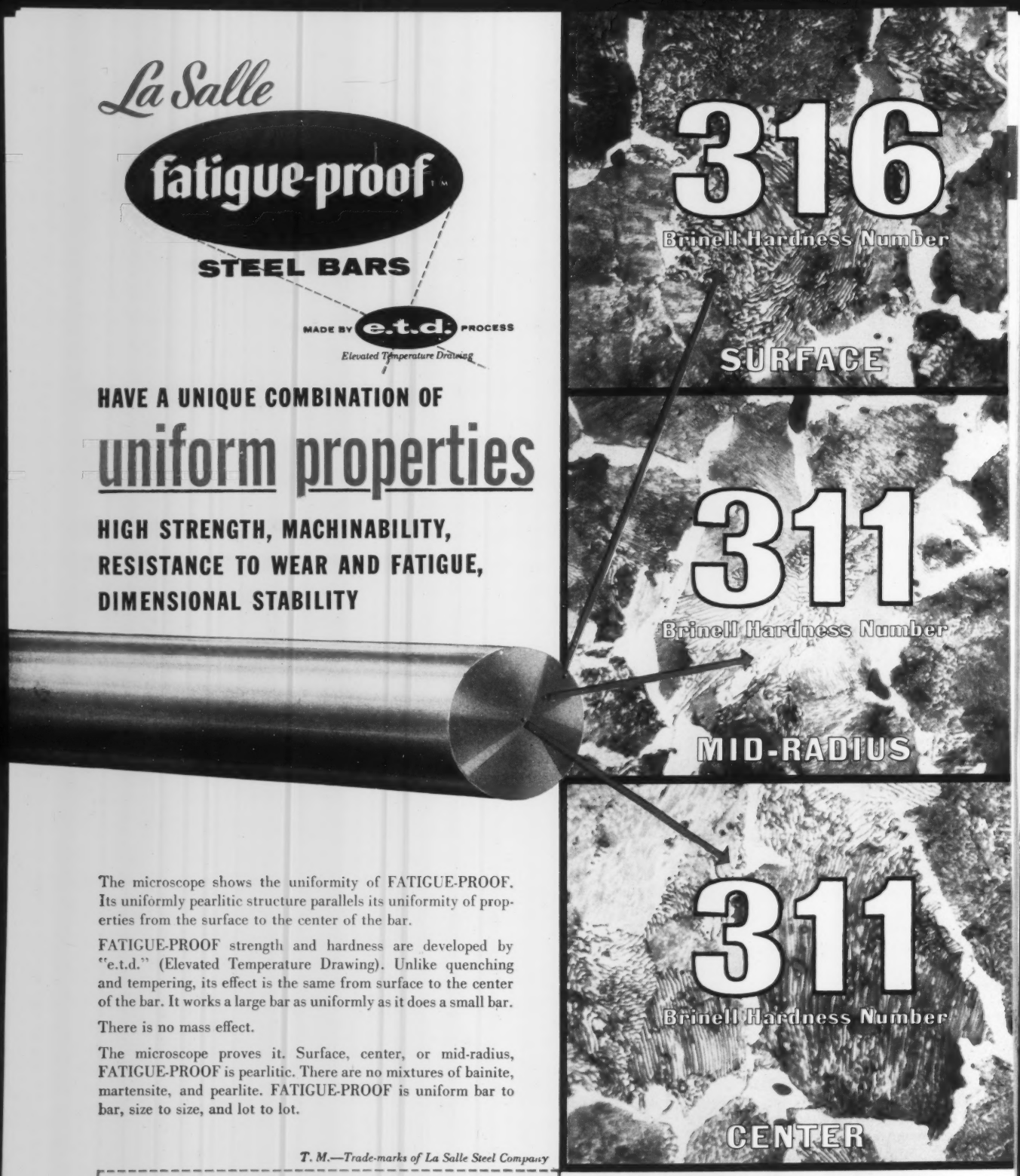

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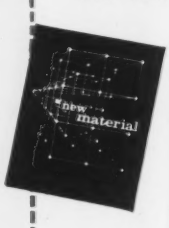

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Foreign Car Design Trends

- Rear engine mounting grows
- Air and spring suspension introduced
- Electronic ignition on way
- Unit body construction continues
- Standard transmissions stay

SAE Talks Small Car Future

"Big Three" in U.S. not expected to put small economy cars into production—yet. Renault's Picard forecasts small car design. More on Du Pont-GM court ruling

BODY STYLES of French and other European cars won't change much in the next five years. It will take that long to amortize tooling and production costs which are spread out over the 2.8 million units built overseas each year.

That's what Fernand Picard of France told the Society of Automotive Engineers at its summer meeting in Atlantic City, N.J.

VIP—Mr. Picard is engineering director of Renault. He's also president of the French counterpart of the SAE. His forecast of design trends has a definite bearing on automotive planning in this country. (Hotel corridors buzzed with speculation about the Big Three's thinking on pint-sized cars.)

Outlook—Imports have doubled in the last two years. They're estimated at over 150,000 this year. While some 40 per cent are the fancy and expensive sports models, the biggest percentage has been low priced economy cars like Germany's Volkswagen.

Automobile people wonder what will happen if sales of foreign cars continue to balloon. The consensus growing out of SAE talkfests and afterhours sessions:

Not Yet—Both Harlow Curtice, GM's president, and Henry Ford II, president of Ford Motor Co., repeatedly have indicated they don't consider foreign cars a threat at this time. They won't take a second look until low-priced imports equal the output of American Motors or Studebaker-Packard offerings.

But the industry isn't missing any bets. It's keeping a close eye on what happens to American Motors' Metropolitan. Made in England, its sales in the U.S. (4389 units) are 84 per cent higher than they were in the first five months of 1956.

Check—Ford, GM and Chrysler all have similar models they could put into production, but experts are betting they'll hold off because tooling and production cost as much for a small car as for a large one. The Atlantic City conventioneers say it's more logical for Ford and GM to bring in one of their own overseas models.

Ford officials say they expect a 400 per cent increase in import sales of the company's British series. Last year, dealers sold between 4000 and 5000 British Fords in this country.

Ford started importing its Vauxhall Victor in trial quantities earlier this year. GM can do the same thing with the German Opel or Australian Holden. Chrysler, of course, has no such opportunity.

Still Time—This could be the year of decision for auto makers. Economy imports will be up. But it will take another year or two before any decision is felt mar-

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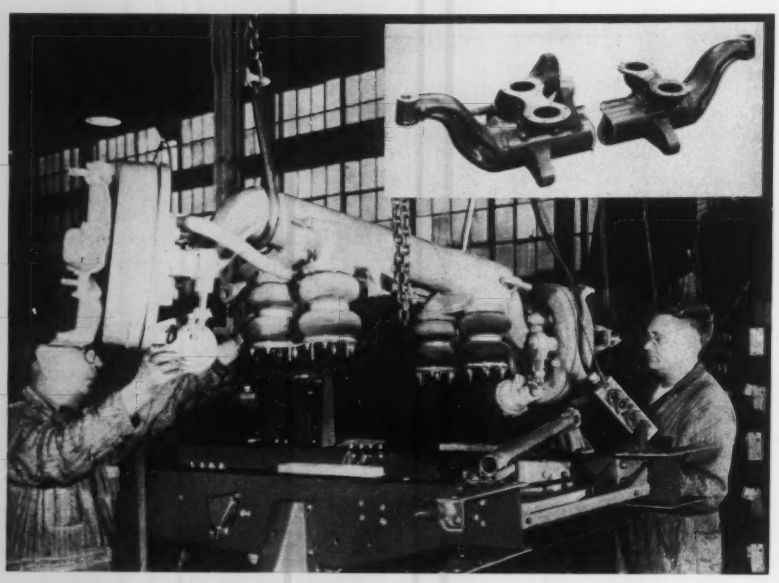

GM's Truck & Coach Division Pushes Air Suspension

Preview of things to come on automobiles is this air suspension axle. It is being lowered onto a truck frame. Chassis is upside down. It will be flipped for further assembly work. Insert shows details of stressproof tubular axle

ketwise. Meanwhile, SAE engineers feel Mr. Picard's ideas on small cars make sense. They'll probably be adapted to small cars no matter where they're made.

In the next five years, he expects French (and other European) auto engineers to move almost exclusively to rear engine mounting in cars having less than 1300-cubic centimeter cylinder displacement.

Drives—Front wheel drive should maintain its present position for cars over 1300-cu cm displacement, although the conventional drive train still offers the most economical solution to heavier American-style autos, says Mr. Picard.

Automatic transmissions cost too much for the average European buyer, so they'll be made only for luxury cars or in limited quantities for export.

Springs — French automobiles are moving toward combinations of air or hydraulics with conventional springs. Coil or leaf springs used with torsion bars also are slated to show up on foreign cars, says Mr. Picard.

Since power steering isn't needed on lightweight models, Mr. Picard asserts the rack and pinion steering gear will continue to be used. Rear engines and standard transmissions make the split rear axle almost mandatory.

Hint—Few changes will appear in braking systems, but 12-volt batteries are in the process of taking over. Mr. Picard hints an electronic ignition is in the works, which means higher compression ratios can be made available.

Smith Tries Cheap Tooling

Production runs of 250,000 pieces have been turned out on a temporary blanking tool. The dies cost between $50 and $500, reports W. R. Wilson, manufacturing manager, automotive division, A. O. Smith Corp., Milwaukee. The new method is patented and licensed by Templet Mfg. Corp., Brooklyn, N. Y.

To date, A. O. Smith has built about 200 of these dies, reports Mr. Wilson. Production experience has been confined to parts made from hot-rolled mild steel (AISI 1008, 1010, 1012 and 1020).

Cost—The Milwaukee firm believes the top figure for this tooling is about 10 per cent the cost of a permanent tool. Plywood, steel strip, tool steel, mild steel, rubber and glue are the only materials needed.

Check List—A. O. Smith has found the tools can be considered under these conditions:

- When tools are needed on short lead time.
- When expert diemakers are scarce.
- When short run output doesn't justify high tool costs.
- When production tolerances permit this type tooling.

The GM-Du Pont Split

Supreme Court ruling on GM-Du Pont case has two chief results:

- In effect, the Supreme Court now says the Clayton Act will be violated if there is even a reasonable likelihood that mergers or stock acquisitions might tend to create a monopoly.
- The Court apparently feels it has the right to probe into any mergers dating back to the passage of the Clayton Act in 1914.

How Much?—Detroit is asking: How much stock will Du Pont have to release to bring its holdings equal to that of other big stock interests? Nobody's quite sure who the next biggest stock group is or how much GM stock it controls, but the feeling is that Du Pont will have to spin off at least 11 or 12 per cent of holdings valued at $2.7 billion.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
5 Mo. Total	2,872,617	2,762,228
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
May 11	125,924	105,552
May 18	127,390	105,763
May 25	127,428	108,126
June 1	82,431	77,433
June 8	127,810†	104,984
June 15	127,500*	100,804

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

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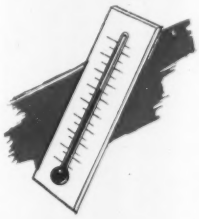

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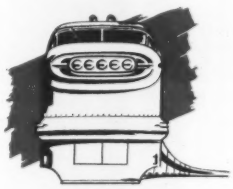

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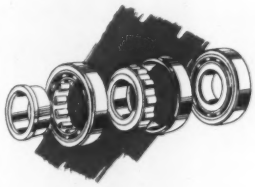

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Armed with a complete line of bearings, they can usually come up with an answer to your particular design problem. In addition to competent design assistance, you can also depend upon the consistent high quality and uniformity of Hyatt Bearings.

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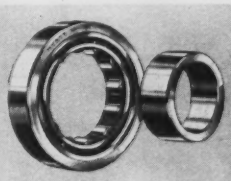
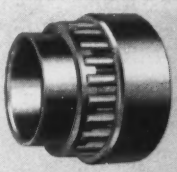
High-capacity cylindrical roller bearings for heavy radial loads and light or intermittent thrust loads.





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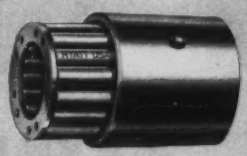

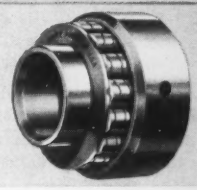

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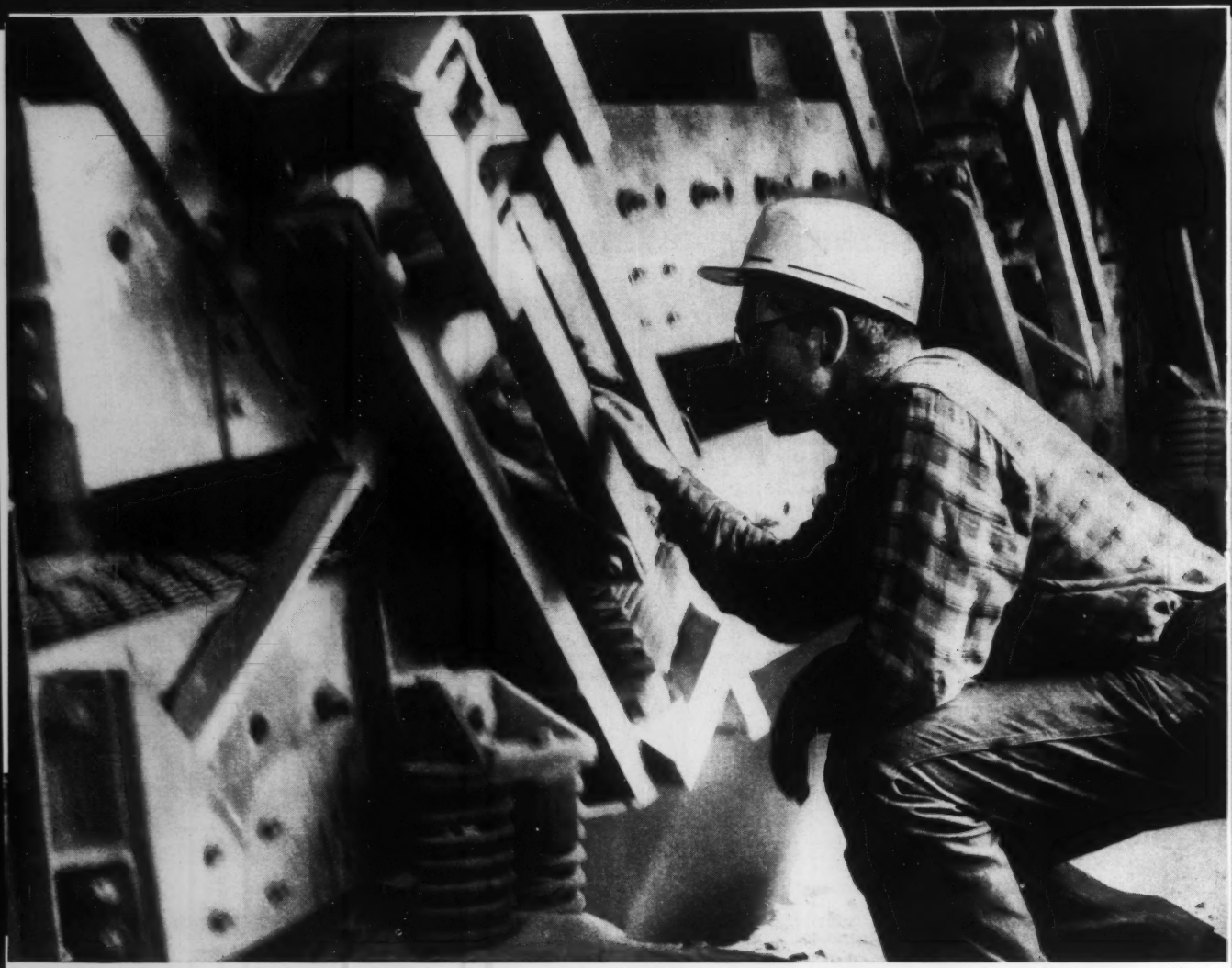

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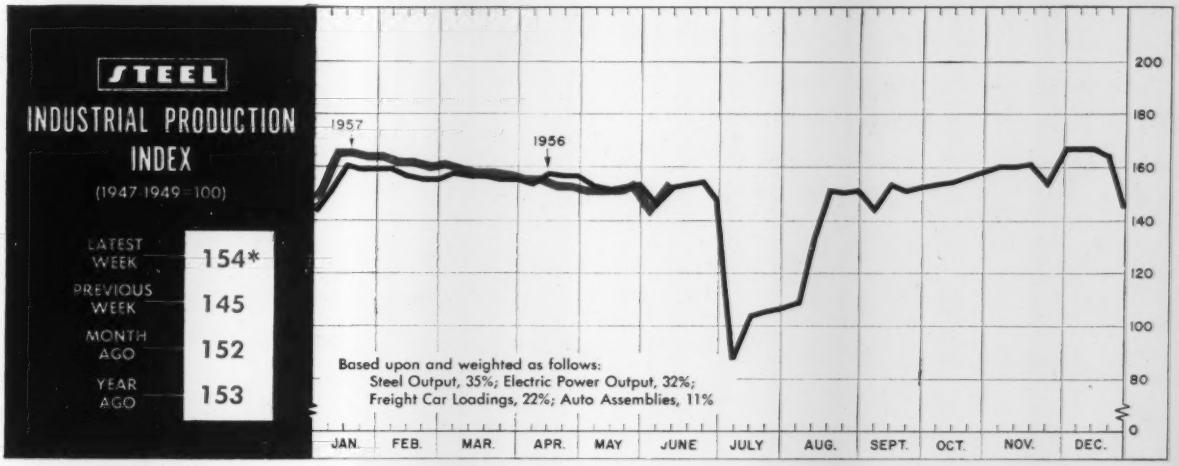

*Week ended June 8.

Sidewise Trend To Go Through September

THE TREND of business is destined to continue its sidewise movement for at least another two or three months in spite of the current flurry of new orders reported by many companies.

Not until late in the third quarter will there be any appreciable break in the straight-line economy. The termination of vacations and preparations for new model auto introductions will turn the trend upward.

Teamwork—So far in 1957, durable goods production has been kept on its high plateau by a combination of a reasonably good supply of new orders and heavy backlogs. Prior to April, dollar value of new orders kept up with the 1956 figures. Taking into account a 3 per cent inflation, physical volume was perhaps a shade behind the year-ago level. In April, orders fell some $900 million behind the 1956 pace to $13.2 billion, seasonally adjusted. But with backlogs at record heights (over $59 billion in January) manufacturers substituted old work for new, so to speak, and kept production near the previous rate. Despite this erosion of backlogs, the figure was whittled to only $57.4 billion by May 1. That's nearly $3 billion above the year-ago mark.

With the exception of a few industries (notably appliances and others connected with home building) manufacturers are satisfied with present operating rates. Generally good first quarter financial reports show why. Some of the costly overtime of last year's boom has been eliminated. Machinery doesn't have to be pushed to the breaking point. Under such circumstances, it is likely that any sizable increase in new orders will result in an increase in backlogs rather than a boost in production.

Case Study—The machine tool industry is one of the best examples of backlog-supported production. New orders in the first four months of 1957 fell to $231,650,000

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,257[1]	2,240	2,299
Electric Power Distributed (million kw-hr)	11,400[1]	10,936	10,951
Bituminous Coal Output (1000 tons)	8,910[1]	9,750	8,552
Petroleum Production (daily avg—1000 bbl)	7,450[1]	7,418	6,998
Construction Volume (*ENR*—millions)	$442.7	$298.9	$250.2
Auto, Truck Output, U. S., Canada (*Ward's*)	161,504[1]	110,868	139,165
TRADE			
Freight Car Loadings (1000 cars)	710[1]	672	778
Business Failures (Dun & Bradstreet)	225	309	238
Currency in Circulation (millions)[3]	$30,836	$30,660	$30,509
Dept. Store Sales (changes from year ago)[3]	+1%	−1%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,738	$21,171	$22,459
Federal Gross Debt (billions)	$275.2	$274.7	$276.5
Bond Volume, NYSE (millions)	$20.4	$16.2	$21.1
Stocks Sales, NYSE (thousands of shares)	10,861	8,676	9,882
Loans and Investments (billions)[4]	$86.2	$85.6	$84.7
U. S. Govt. Obligations Held (billions)[4]	$25.9	$25.1	$26.9
PRICES			
STEEL's Finished Steel Price Index[5]	228.59	228.59	210.45
STEEL's Nonferrous Metal Price Index[6]	230.6	231.5	275.5
All Commodities[7]	117.5	117.2	114.2
Commodities Other Than Farm & Foods[7]	125.3	125.2	121.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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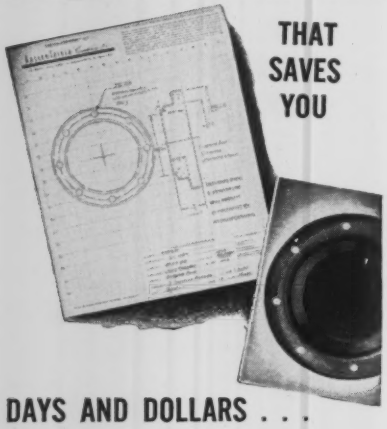

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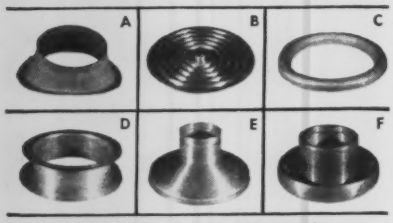
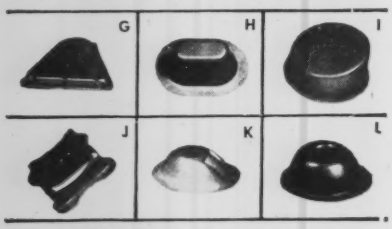


METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Decorative cover; C—Retainer ring; D—Winding reel; E—Electronic shield; F—Electrical detail.

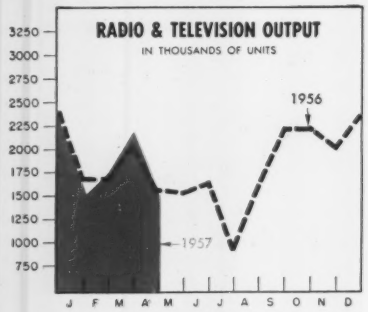


HYDROFORMING:
Typical items: G—Aircraft detail; H—Spindle cover; I—Aircraft detail; J—Auto bracket; K—Light reflector; L—Air cleaner.

ROLAND TEINER
Company, Inc.

DEPT. 42 · 134 TREMONT STREET, EVERETT 49, MASS.
Telephone EVerett 7-7800
ENGINEERING REPRESENTATIVES IN PRINCIPAL CITIES

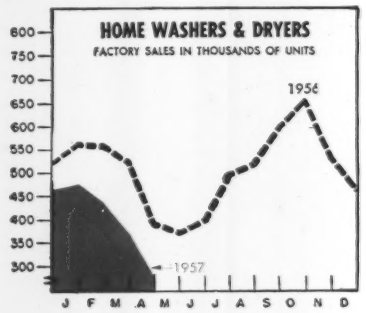
THE BUSINESS TREND



	Radio		Television	
	1957	1956	1957	1956
Jan.	1,086	1,079	450	588
Feb.	1,265	1,094	465	576
Mar.	1,609	1,360	560	680
Apr.	1,116	993	361	550
May	....	1,060	...	468
June	....	1,073	...	553
July	....	567	...	337
Aug.	....	991	...	613
Sept.	....	1,319	...	894
Oct.	....	1,349	...	821
Nov.	....	1,382	...	680
Dec.	....	1,715	...	627
Totals	....	13,982	...	7,387

Radio-Electronics-Television Mfrs. Assn.

Charts copyright, 1957, STEEL.



	Washers		Dryers	
	1957	1956	1957	1956
Jan.	331,314	393,717	144,621	166,243
Feb.	319,580	405,631	114,517	148,522
Mar.	286,205	405,744	83,668	113,031
Apr.	230,675	324,238	42,850	64,923
May	.....	315,249	.....	55,330
June	.....	340,235	.....	58,441
July	.....	380,172	.....	117,548
Aug.	.....	373,925	.....	144,537
Sept.	.....	402,631	.....	192,724
Oct.	.....	449,409	.....	206,929
Nov.	.....	357,935	.....	170,529
Dec.	.....	298,368	.....	162,953
Totals	.....	4,447,254	.....	1,601,710

American Home Laundry Mfrs. Assn.

from about $360 million during the corresponding 1956 period. At the beginning of this year, the industry had an average backlog equivalent to 6.2 months' output. Manufacturers reduced that backlog to five months by May 1 (still considered a comfortable position). Shipments for the January-April period are ahead of the year-ago figure, $331.5 million vs. $265.2 million, according to the National Machine Tool Builders' Association. It is doubtful that shipments would be stepped up much even if new orders resumed the 1956 clip.

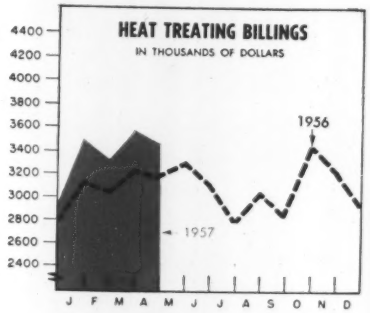
In this industry, a substantial amount of new orders is assured by: 1. Technological developments requiring replacement of obsolete tools. 2. General expansion in industry. 3. Maintenance of a modern machine tool reserve as part of the government's national defense program. Shipments this year will be substantially the same as last year's $886 million, industry officials believe.

Construction Good in May

May represented the best construction month of the year, both in contract awards and value put in place. Following seasonal patterns, June, July and August should be even better. The Departments of Labor and Commerce report actual outlays of slightly over $4 billion during May, bringing the year-to-date total to a record $17.1 billion, 3 per cent above the 1956, five-month figure. At that rate, construction will amount to $46.9 billion this year, compared with a revised figure of $46.1 billion for 1956. Gains were chalked up in May over April for every category except private industrial, which has held level at about $270 million since January. On a year-to-year comparison, gains in public construction were greater than losses in private building.

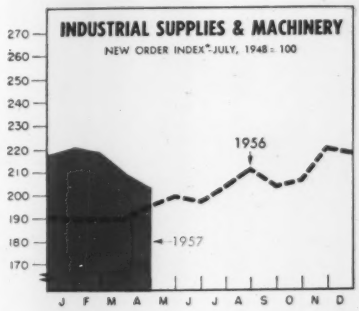
Engineering News-Record's tabulation of heavy construction awards showed similar gains for May. Despite the improvement, 1957 still lagged behind 1956 by 19 per cent on June 1. However, it is encouraging to note that on the basis of *EN-R's* weekly reports, the gap was closed to 17 per cent by June 6.

Home building is still the weakest segment of the construction industry. Tight money will keep starts down to around 900,000 units this year, according to Melvin H. Baker, chairman of National Gyp-



	1957	1956	1955
Jan.	3,494.7	3,116.4	2,181.0
Feb.	3,337.9	3,124.8	2,184.5
Mar.	3,571.6	3,330.9	2,599.5
Apr.	3,462.6	3,166.2	2,579.5
May	.....	3,292.3	2,644.4
June	.....	3,094.5	2,645.1
July	.....	2,762.5	2,180.0
Aug.	.....	3,040.7	2,535.6
Sept.	.....	2,832.9	2,666.8
Oct.	.....	3,442.3	2,897.2
Nov.	.....	3,205.7	2,935.7
Dec.	.....	2,931.2	2,891.1

Metal Treating Institute.



	1957	1956	1955
Jan.	221	190	160
Feb.	219	190	166
Mar.	210	190	171
Apr.	203	195	172
May	...	199	177
June	...	197	189
July	...	203	182
Aug.	...	211	186
Sept.	...	203	196
Oct.	...	206	195
Nov.	...	220	194
Dec.	...	218	191

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.

sum Co., Buffalo. He continues: "Money for home mortgages is easing a bit; the vacancy rate is low; and the number of families keeps rising. If those trends continue, home starts should get back to something more than a million next year."

Radio-TV Sales Strong

To look at the production figures in segments of the appliance industry (see charts, page 72), you'd never guess that in some cases sales are comparable to those of 1956—this is especially true in the radio-television industry, where both producers and dealers have been clearing out inventories for months. During the first four months of 1957, cumulative TV sales exceeded cumulative production by about 200,000 units. Coupled with introduction of new models, this inventory reduction could result in an upturn in production before long.

Radios, which refuse to be outmoded by visual communications, show gains in both production and sales. January-April production of all sets (including auto) came to 5,075,180 units, compared with 4,525,225 in the 1956 period. Cumulative retail sales of all but auto sets came to 2,362,068, compared with 1,984,915 a year ago.

April production figures for other appliances reflect the serious effect of reduced housing starts and tight credit. The National Electrical Manufacturers Association reports factory sales of refrigerators declined to 281,600 units from 353,300 in April last year. Electric ranges, including built-ins, dropped from 157,500 last year to 107,200 this April.

Market Memos

- The steel industry's payroll for April came to $332.5 million, compared with $344.2 million this March and $326.7 million in April, 1956. Employment was 670,200, compared with 671,100 in March.
- To date, department store sales are 2 per cent ahead of those in the similar 1956 period.
- Manufacturers of oil heating equipment look for an active demand for their products during the final six months of 1957. They may boost prices after July 1, but competition will prevent them from passing on all the expected increase in steel prices.

Somers
UNIGRAIN®
thin strip brass
for
deep drawing

Uniform fine grain size of Somers eyelet brass—less than .010 mm. (75X).

with
Fine Grain Finish

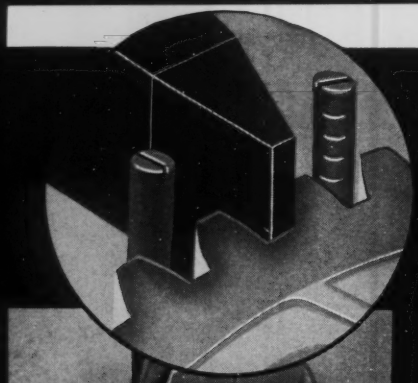
Somers Brass Company is pleased to announce the availability of a new, unique annealing process which makes possible a uniform fine grain of less than .010 mm. which can be drawn to full 40% elongation.

Developed in cooperation with the Selas Corp. of America this new process makes it possible to deep draw Somers THIN STRIP and still obtain a fine grain which is easily buffed to a brilliant finish.

And this new Selas Furnace provides high production as well as close control of temper and uniformity. It is typical of the modern equipment with which Somers produces copper, brass and other alloys to rigid specifications between .010" and .00075".

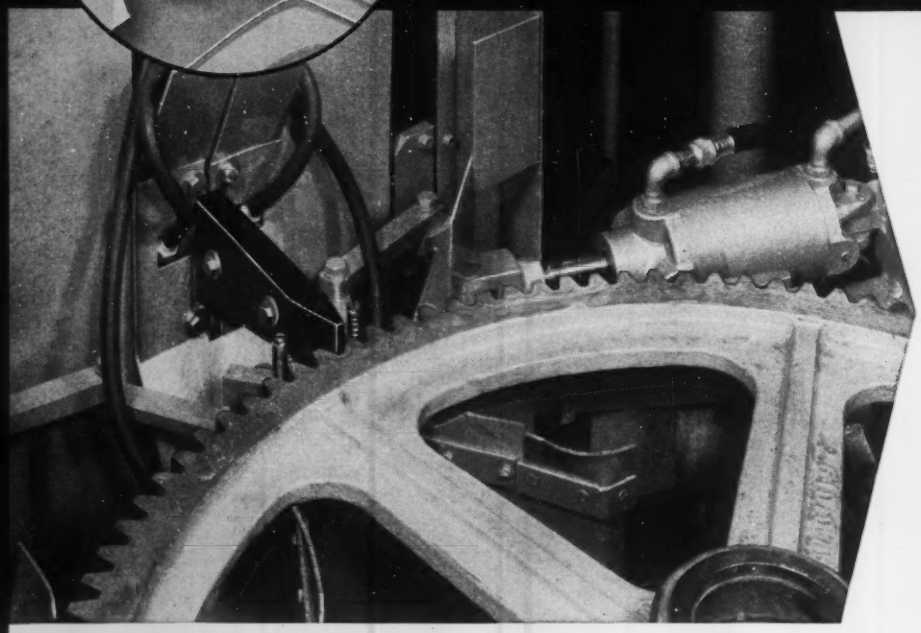
If you have a problem with thin strip, let Somers experience help you. Write for confidential data blank or field engineer.

Somers Brass Company, Inc.
WATERBURY, CONN.



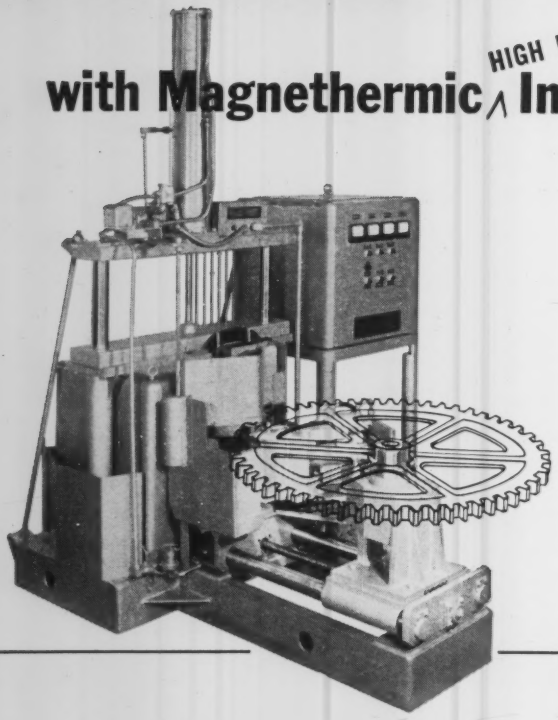
LOOK TO THE ROOT

FOR IMPROVED GEAR PERFORMANCE



tooth by tooth Gear "Hardening"

with Magnethermic HIGH FREQUENCY Induction Scanning Equipment



Heat treating the critical root zone makes an appreciable difference in physical properties and fatigue strength.

With high frequency induction heating, the tooth can be full hard for maximum wear resistance. Large gears can be hardened with small capacity equipment.

Scanning eliminates the need for inductor change with varying gear face widths. Automatic controls, including indexing and quenching, result in a high production rate and uniform results.

This is one type of gear hardening. Size and production rate dictate to a great degree the type of equipment. Whatever your need in gear hardening or other heating applications, Magnethermic's experience with induction heating can be useful.

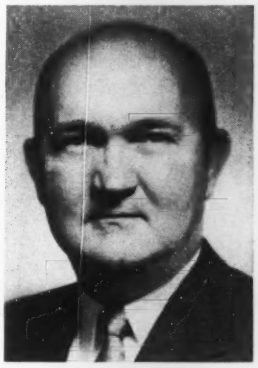
Prompt response to your inquiry — Magnethermic, Youngstown, Ohio.

see MAGNETHERMIC for Induction Heating

INDUCTION HEATING EQUIPMENT

MAGNETHERMIC
corporation
9990 SIMON ROAD YOUNGSTOWN 7, OHIO

PAUL H. DAVEY JR.
Davey Compressor president



REESE B. LLOYD
Heintz Mfg. president

E. W. GENTZ
Potter & Brumfield post

EDWARD N. COOLEY
Alco Products v.p.

Paul H. Davey Jr., former vice president-production, was elected president, **Davey Compressor Co.**, Kent, O., succeeding **Paul H. Davey Sr.**, elected to the new position of chairman of both Davey Compressor Co. and Davey International Inc. The new president and treasurer of Davey International Inc. and general manager of Davey Compressor Co. is **J. T. Myers**, previously vice president-sales.

Heintz Mfg. Co., Philadelphia, named **Reese B. Lloyd** president and a director. Formerly vice president-operations, television and radio divisions, Philco Corp., he succeeds **Charles B. Grace** who was elected chairman, still continuing as treasurer. Mr. Grace succeeds **William J. Meinel**, now a consultant and chairman of the executive committee.

R. L. Williams was promoted to assistant chief engineer, automotive division, **Timken Roller Bearing Co.**, Canton, O. He was district sales manager in Columbus, O.

James J. Clarke was named sales manager, **Ramset Fastening System**, Cleveland, a part of Olin Mathieson Chemical Corp.

International Steel Co., Evansville, Ind., named **Frank Schroeder** vice president and general manager of the steel division and **Arthur M. Simpson** vice president and general manager of the metal products division. **Walter Koch**, board chairman, has resigned.

E. W. Gentz was made director of manufacturing for **Potter & Brumfield Inc.**, Princeton, Ind., subsidiary of American Machine & Foundry Co. He was vice president and general manager, automotive division of Sparks Withington Co. He succeeds **Howard Meuche** who resigned to become president and general manager of Universal Scientific Co. Inc., Vincennes, Ind.

T. W. Krueger was promoted to sales manager, **Duff-Norton Co.**, Pittsburgh. He was sales manager of its jack division.

Addressograph-Multigraph Corp., Cleveland, appointed **D. G. Hartman** Addressograph sales manager and **W. S. Anderson**, Multigraph sales manager. They were assistant sales managers.

W. A. Tweedie was named to the new post of manager of programming, **Temco Aircraft Corp.**, Dallas. Former manager of its Garland, Tex., plant, he heads a department which will co-ordinate the company's building and corporate planning schedule.

Elgin National Watch Co., Elgin, Ill., appointed **Dale V. Cropsey** assistant to the president, specializing in development of its industrial divisions. He was vice president and director of sales, Potter & Brumfield Inc.

Virginia Metal Products Inc., Orange, Va., elected **Fred I. Courtney** to the new post of executive vice president. He continues as treasurer.

Edward N. Cooley was appointed vice president, **Alco Products Inc.**, New York. Formerly director of administrative services, he will be in charge of the thermal products and petroleum industry equipment divisions at Dunkirk, N. Y.

Barry Controls Inc., Watertown, Mass., named **Edward A. Johnson**, former vice president, to the new post of vice president-marketing.

Lou Tuglus was made assistant sales manager, **Clearing Machine Corp.**, Chicago, a division of U.S. Industries Inc. He was in sales engineering for the Chicago manufacturing division of Clearing.

Mord Lewis was elected executive vice president and director, **Anaconda Aluminum Co.**, New York, a subsidiary of Anaconda Co.

H. E. Redenbaugh was named manager of the international division, **Mine Safety Appliances Co.**, Pittsburgh. Appointed export sales manager was **M. L. Symington**, formerly administrative assistant to the manager of the industrial department.

Robert N. Kendall was appointed vice president, **Colonial Broach & Machine Co.**, Detroit. His headquarters will continue to be in Washington.

Crucible Steel Co. of America, Pittsburgh, appointed **C. J. Ryan** to the new post of assistant to the vice president-sales, with headquarters in Detroit. **M. J. Dempsey**, former assistant branch man-

ELMER I. GHRIST

DR. LOUIS A. CARAPELLA

Jessop Steel Co. executives

WILLIAM J. McKEE

ROBERT E. WILLIAMS

National Tube Div. sales executives

ager, succeeds him as manager of its Detroit sales branch.

Jessop Steel Co., Washington, Pa., named **Elmer I. Ghrist**, former director of research and metallurgy, general superintendent and **Dr. Louis A. Carapella** technical director. Dr. Carapella was a research director at the metal division research center of Continental Can Co. in Chicago.

Jesse L. McAllister was named vice president and manager of manufacturing, **Widener Engineering Corp.**, San Diego, Calif.

Harry M. Nordberg was elected executive vice president and a director, **Pitney-Bowes Inc.**, Stamford, Conn. Succeeding him as vice president-sales and service is **Elwood M. Davis**, former general sales manager. **Blynn B. Beck** was appointed general sales manager.

S. S. Wilson was appointed executive vice president and general sales manager, **Sel-Rex Corp.**, Nutley, N.J. He was vice president in charge of its Detroit office.

Robert F. Moody was named domestic sales manager-industrial trucks, **Hyster Co.**, Portland, Oreg. He was eastern division sales manager. **Ray M. Ronald**, former western division sales manager, was made domestic sales manager, tractor equipment division.

Harry W. Eveslage was made general sales manager, **Morrison-Drabner Steel Co.**, Cincinnati. He was assistant to the general manager.

H. H. Clark was appointed assistant general manager, spring division, **Eaton Mfg. Co.**, Cleveland. **R. G. Green** was named sales manager-leaf spring department and **R. D. Morrison** sales manager-coil spring department.

John H. Froelich was appointed manager-production control, **Universal-Cyclops Steel Corp.**, Bridgeville, Pa.

Harold B. Chambers was made director of metallurgy, **Atlas Steels Ltd.**, Welland, Ont. He was superintendent of inspection and metallurgical services.

McQuay Inc., Minneapolis, appointed **G. G. Workinger** general sales manager. He was manager of procurement, York division of Borg-Warner Corp.

William J. McKee was made assistant vice president-sales, **National Tube Division**, United States Steel Corp., Pittsburgh. Succeeding him as general manager of sales is **Robert E. Williams**, former director-distribution and availability, U.S. Steel Corp.

Donald Leighton was made assistant to the vice president and general manager, Owosso, Mich., Division, **Midland Steel Products Co.** He was president and general manager of Pressed Metals Co.

Millard D. Shriver was named vice president-assistant to the president, **Panellit Inc.**, Skokie, Ill.

Royal Oak Tool & Machine Co., Royal Oak, Mich., appointed **W. A.**

HAROLD E. PAPE

MAXWELL D. COE

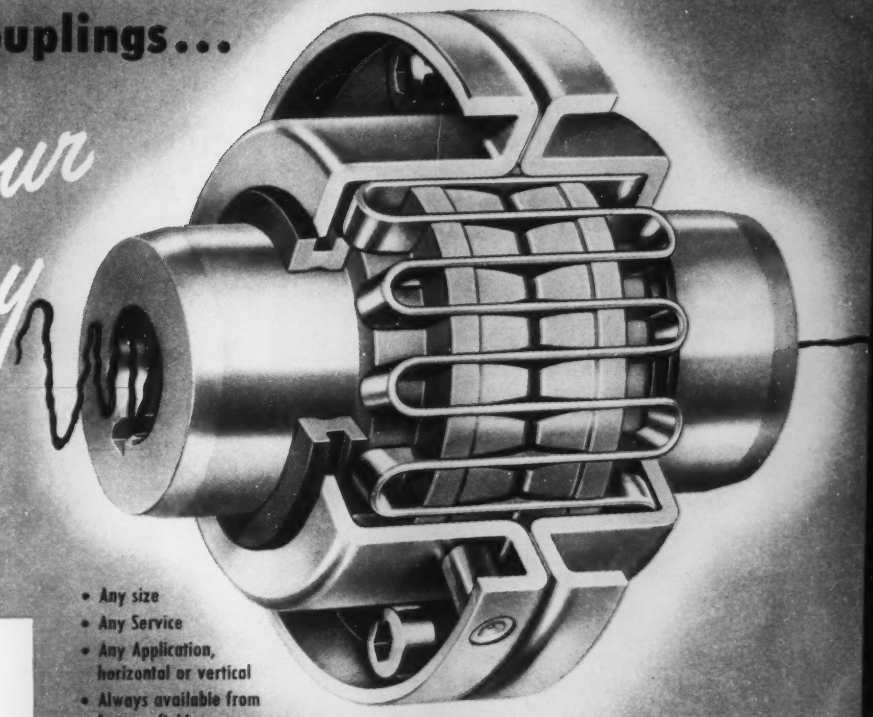
CLEMENS J. DIEMAND

Stanley Works management changes

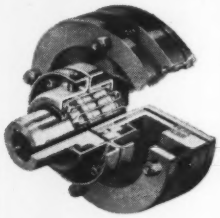
Harold E. Pape, former vice president in charge of the Stanley Steel Division and director of purchases, was elected executive vice president, **Stanley Works**, New Britain, Conn., succeeding **W. Ronald Morse**, retired. Named as vice president in charge of the Stanley Steel Division was **Clemens J. Diemand**, former division plant manager. **Maxwell D. Coe**, former purchasing agent, was made director of purchases.

Falk Steelflex Couplings...

Protect your machinery in 2 ways



- Any size
- Any Service
- Any Application, horizontal or vertical
- Always available from factory, field or distributor stocks

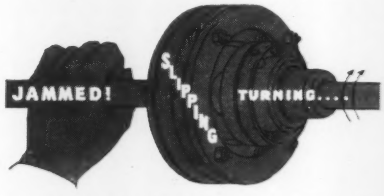


Falk Controlled Torque Couplings prevent damage from overloads

In applications where danger from overloads exists, use the FALK Type FT Controlled Torque Coupling. The Type FT has all the features and advantages of standard FALK Steelflex couplings—and, in addition, has an adjustable friction slip clutch, enabling the operator to set the coupling to slip at any predetermined overload.

This controlled-torque principle not only prevents transmission of dangerous shocks and limits overloads; it eliminates the breaking of shafts caused by jamming of driven equipment.

An outstanding advantage of the Type FT Coupling is that, as soon as the cause of the overload is removed, the entire coupling will rotate and transmit power without replacing parts or repairing coupling.



There's real economy in using Type FT Controlled Torque Couplings. Many users have reported that these couplings paid for themselves the very first time they slipped (under overload) because of the protection against damaged driving or driven machinery!

...cost less per year of service!

You get *double protection* when you connect your driving and driven machinery with a Falk Steelflex Coupling—the all-steel coupling with the exclusive grid-groove design! First, its *torsional resilience* smothers shock and vibration; and second, the Steelflex design prevents damage and lowered efficiency by accommodating shaft misalignment.

Why have increasing numbers of key men in industry standardized on Falk Steelflex Couplings? Their experience has proved that Falk Steelflex Couplings prolong the service life of their machinery... are trouble-free and need minimum maintenance . . . are easy to install, lubricate and disconnect . . . and *cost less per year of service* than ordinary couplings.

One basic Steelflex design—the type F, in its many sizes—is adaptable to more than 90% of all industrial applications. For applications involving danger from overloads, Modified Type FT Controlled Torque couplings (see column at left) are ideally suited. There are numerous other special or dual purpose Steelflex couplings for unusual applications. **Write to Department 247** for engineering bulletin, including selection and dimension tables.

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

FALK

...a good name in industry

MANUFACTURERS OF:

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

CHARLES N. PERRY
Rockwell factory mgr.

ALEXANDER I. STAYMAN
American Nut & Bolt post

RALPH L. BOYER
Cooper-Bessemer v.p.

HOWARD E. MORISON
Ingersoll Steel v. p.

G. M. BAUMANN
American Smelting post

RUSSELL DUPUIS
Vickers div. mfg. mgr.

Johnson sales manager of its grinder division.

Howard E. Morison was appointed vice president, **Ingersoll Steel Division** of Borg-Warner Corp., Chicago. He was with Crucible Steel Co. of America.

G. M. Baumann was appointed general manager of a new central aluminum department, Federated Metals Division, **American Smelting & Refining Co.**, New York. He was assistant to the vice president in charge of the division. The department includes its Detroit plant and a new one under construction at Alton, Ill.

H. W. Dauber was made manager-marketing services for the mining and international divisions of **Mine Safety Appliances Co.**, Pittsburgh. He was assistant to the manager of the mining department.

A. T. Mortrud was appointed manager of the arc welding division, **Burdett Oxygen Co.**, Cleveland.

Russell Dupuis was made manufacturing manager, machinery hydraulics division, **Vickers Inc.**, Detroit. Succeeding him as plant manager at Omaha, Nebr., is **John Slack.**

Phil H. Richey was named vice president-finance, **Wagner Bros. Inc.**, Detroit. He was plant manager of the Bowling Green, Ky., facilities of Detrex Chemical Industries Inc.

Dr. Walter A. Dean was named assistant development metallurgist for **Aluminum Co. of America**, Pittsburgh. He is succeeded as chief metallurgist for its Cleveland works by **Thomas R. Gauthier.**

West Steel Casting Co., Cleveland, named **Walter H. Kraus** assistant sales manager to replace **Seaver C. Kenyon**, retired.

Harold Hoekelman was appointed manager of the Chicago district of **Youngstown Sheet & Tube Co.**, succeeding **A. J. Cochrane** who was named assistant to vice president.

Charles N. Perry was named factory manager of **Rockwell Mfg. Co.'s** new Porterville, Calif., plant. He was purchasing agent for its Oakland, Calif., plant.

American Nut & Bolt Fastener Co., Pittsburgh, named **Alexander I. Stayman** president, succeeding **Glen A. Aiken**, retired. He was with National Screw & Mfg. Co., Cleveland. **J. W. Brown**, secretary, assumes the additional duties as treasurer.

Ralph L. Boyer was elected vice president and director of engineering, **Cooper-Bessemer Corp.**, Mt. Vernon, O. Former vice president and chief engineer, he succeeds **Hewitt A. Gehres**, retired.

Robert C. Palmer was made executive vice president, **Ingalls Iron Works Co.**, Birmingham. Succeeding him as vice president and assuming duties as controller is **M. H. Osborn. J. Carter Hammel** was named vice president-treasurer.

Joseph T. Ryerson & Son Inc. appointed **Clive C. Earle** sales manager for its Buffalo plant. He was manager of alloy and stainless steel sales at its Pittsburgh steel service plant.

OBITUARIES...

B. J. Keating, 72, chairman and treasurer, **Standard Tool & Mfg. Co.**, Arlington, N. J., died June 1.

Harry T. Paterson, 46, operational manager-Harbor Island and Kure Beach corrosion test stations, **International Nickel Co. Inc.**, New York, died May 27.

Stanley Wentz, 66, president, **Pennsylvania Foundry Supply & Sand Co.**, Philadelphia, died May 29.

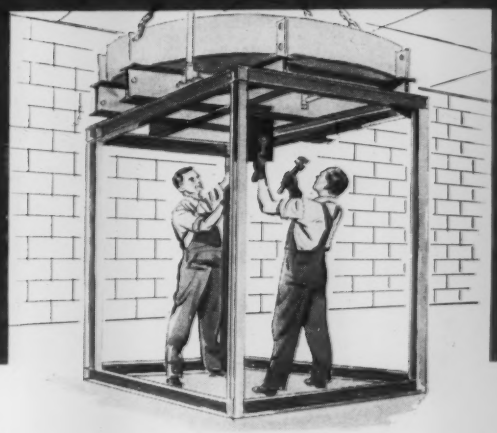
John J. Russ, 82, chairman and former president, **National Grinding Wheel Co. Inc.**, North Tonawanda, N. Y., died May 28.

Emil J. Yagle, 70, retired district sales manager, **H. H. Robertson Co.**, Buffalo, died May 22.

Marshall K. Wilkinson, 69, retired chairman, **Overland Iron & Steel Works**, San Bernardino, Calif., died May 28.

NINTH OF A SERIES

Customer's Report



IT MAKES SENSE—

"The fewer the parts to wear—the less to take care of—"

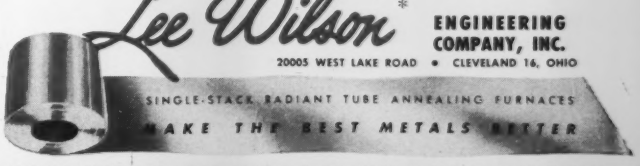
* (SINGLE STACK FURNACES HAVE THE FEWEST POINTS OF MAINTENANCE)

Maintenance is more than ever an important consideration when purchasing new equipment. An interruption in production today quickly absorbs narrow profit margins.

A study of annealing furnaces for a given tonnage dramatically shows the Lee Wilson Single Stack to have 18 to 49% fewer items requiring service—thus, a correspondingly smaller chance of costly breakdowns. This is another big reason why more and more steelmakers are turning to Single Stack furnaces by Lee Wilson for all their annealing requirements.

Only Lee Wilson Furnaces Give You All These Advantages

1. GREATER FLEXIBILITY
2. MORE UNIFORM HEAT APPLICATION
3. IMPROVED CUSTOMER SERVICE
4. HIGHER PRODUCTION
5. BETTER LOAD FACTOR
6. MINIMUM PROCESS INVENTORY
7. REDUCED LABOR COST
8. BETTER OPERATING CONDITIONS
9. LOWER MAINTENANCE COST
10. REDUCED INSTALLATION COSTS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ENGINEERING COMPANY, INC.
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SINGLE-STACK RADIANT TUBE ANNEALING FURNACES
MAKE THE BEST METALS BETTER

375

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* MAINTENANCE ITEMS FOR 100,000 TONS PER MONTH

	SINGLE STACK 72 FCE. 198 PED.	4-STACK 29 FCE. 320 PED.	8-STACK 18 FCE. 432 PED.
Base fan motors	198 (15 H.P.)	320 (15 H.P.)	432 (15 H.P.)
Base fans	198	320	432
Heater tubes	720	725	900
Burners	720	725	900
Thermocouples (base)	198	320	432
Furnace blower motors	72 (5 H.P.)	29 (10 H.P.)	18 (20 H.P.)
Instruments	72	58	36
Inner covers	198	320	432
Gas pressure regulators	72	29	18
Thermocouples (Fce.)	72	58	36
Bases (pedestals)	198	320	432
Total maintenance items	* 2,718	* 3,224	* 4,068
% Increase	—	18.6	49.0

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to match the DEPENDABILITY of LAMSON BOLTS

The perfect teammate for a Lamson Bolt is a Lamson Nut.

Because they come from the same family, and are manufactured to the same quality standards, Lamson Nuts and Bolts make the perfect holding combination. A COMPLETE range of sizes and types are in stock ready for immediate delivery.

For assured quality and fit that meets production line standards, always specify Lamson Nuts.

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Installs Furnaces

Six 60-ton annealing units at Detroit Steel's Portsmouth, O., plant will process strip

DETROIT STEEL Corp. has put into operation six new 60-ton capacity coil annealing furnaces at its Portsmouth, O., plant. This is part of the firm's continuing $90 million expansion program. Additions to heat treating capacity since Detroit Steel's mill-wide modernization began four years ago total 18 furnaces and 48 bases.

The new furnaces have been added to handle the company's increased output of flat-rolled products.

Capacity—Used for bright annealing of cold-rolled strip 0.0239 to 0.089 in. thick and up to 48 in. wide, each furnace has an average processing rate of 2.25 tons an hour. The strip is processed in 68-in. coils.

Natural gas, brought in by Columia Gas System's United Fuel Gas Co., Charleston, W. Va., serves as a fuel and as a source of controlled atmosphere for the new Lee Wilson single stack radiant tube furnaces. Air and water are used to cool the strip after completion of the annealing cycle.

The installation is adjacent to the first battery of 12 circular Lee Wilson gas fired furnaces installed four years ago. A Heppenstall, 40,000 lb capacity tong is used to load and unload the strip.

Keystone Brass Building Plant

Keystone Brass Works, Erie, Pa., is constructing a $300,000 plastics plant. Operations are scheduled to start around Sept. 1.

Kaiser Activates Foil Line

Aluminum foil is being rolled on two, new high speed mills at Kaiser Aluminum & Chemical Corp.'s plant, Ravenswood, W. Va. The 60-in. mills handle different gage strip as wide as 56 in. at speeds up to 3000 fpm. Two more mills, including a 72 incher designed for a top speed of 4500 fpm and widths up to 66 in., are being installed. They will be in operation by early 1958. The mills adjoin light gage sheet rolling facilities placed in operation in mid-January at the partially completed, $200-million integrated works. Two huge facilities (a reduction plant and a plate, sheet and foil rolling mill) are being constructed on a 2500-acre site along the banks of the Ohio river.

Stanley Opens Strapping Plant

Stanley Steel Strapping, a division of the Stanley Works, New Britain, Conn., has dedicated its new factory and office building. Full scale production is expected to be reached by Sept. 1. John C. Cairns, president, says: "The expansion of these facilities, involving an investment in plant and equipment of over $2 million, will permit a considerable increase in production capacity. In addition to this investment, another division, Stanley Steel, will install a 26-in. reversing mill to insure an adequate supply of steel for the production of strapping."

Burroughs Enlarges Plant

ElectroData Division, Burroughs Corp., has completed a sixfold enlargement of its Pasadena, Calif., plant. The organization recently announced conditional purchase of 160 acres near Santa Ana, Calif., for future expansion.

Harvey Boosts Press Facilities

Harvey Aluminum, Torrance, Calif., has its huge hydraulic forging press in full production. It can produce complex aluminum shapes and parts with undercuts and backdrafts. The press is of down stroke, column type design, weighs 1,230,000 lb and has an over-all height of 43 ft. The main ram can apply 4000 tons of pressure; each of the opposed side rams, 2000 tons. It is part of Harvey's battery of hydraulic and mechanical forging presses which range up to 8000 tons in capacity.

Gibraltar Steel To Build

Gibraltar Steel Corp., steel distributor, will build a $250,000 warehouse and office building in Cheektowaga (Buffalo), N. Y. Containing 40,000 sq ft of space, it will be completed about Jan. 1, 1958.

Buys Into Bethlehem Foundry

Superior Tool & Die Co., Detroit, acquired 71.14 per cent of the outstanding stock of Bethlehem Foundry & Machine Co., Bethlehem, Pa., maker of processing equipment for the metallurgical, cement, chemical, oil and sugar industries. Superior Tool is negotiating for the purchase of the minority interest in the Bethlehem firm.

Weldaloy Forms Western Unit

Weldaloy Products Co., Van Dyke, Mich., opened a production facility in Burbank, Calif., to serve as headquarters for a Weldaloy Western Division. The company produces copper-alloy tube mill electrodes for the electric welding of pipe and tubing.

Hayes To Make Steel Lockers

Hayes Aircraft Corp., Birmingham, has established a steel locker manufacturing plant at its aircraft modification center in that city. Capacity is 5000 lockers a month.

Ferguson Gear Opens Branch

Ferguson Gear Co., Gastonia, N. C., opened a sales and engineering office at 2121 E. 40th St., Savannah, Ga. Harvey D. Black is in charge.

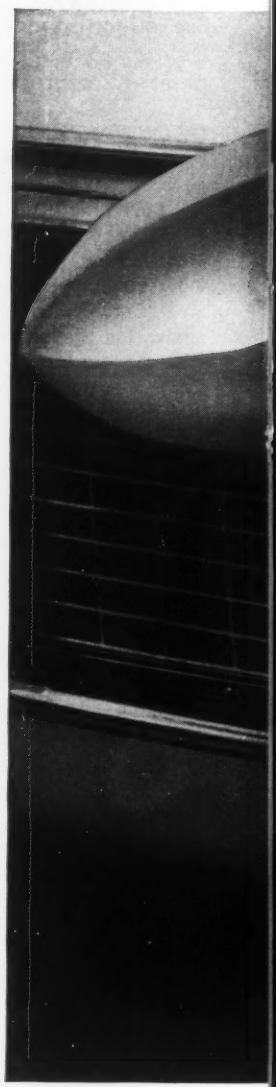
SPS Expanding Fastener Plants

Standard Pressed Steel Co. will build a 55,000 sq-ft addition to its main Jenkintown, Pa., plant. The $750,000 project will permit an increase in the production of recently introduced precision fasteners and an enlargement of research and development laboratories. It is the second phase of an announced $1.6-million plant building program at Jenkintown that will add 160,000 sq ft to the headquarters plant. Currently under construction at Jenkintown is an 80,000 sq-ft addition to the company's Pressed Steel Division. SPS will spend about $9 million on its expansion and modernization program this year. It has broken ground for a 280,000 sq-ft manufacturing plant in Santa Ana, Calif., and is nearing completion

(*Please turn to page* 84)

For whatever you fabricate . . .

N-A-X FINEGRAIN STEEL COMBINES STRENGTH WITH FORMABILITY



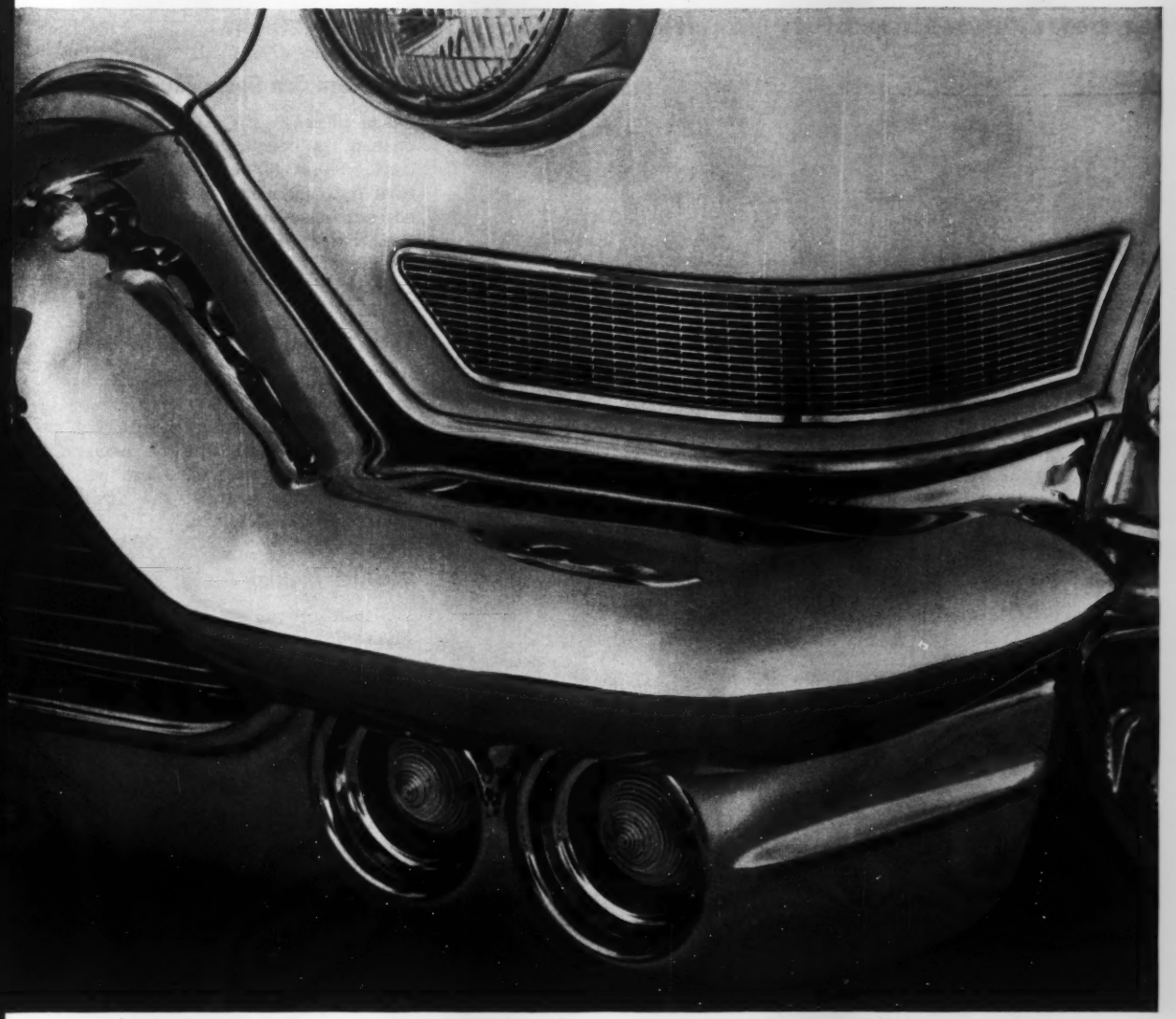
Among the many economical advantages of N-A-X FINEGRAIN—a low-alloy, high-strength steel with widely diversified applications in modern metals design—is its combination of great strength with excellent formability. Even at the higher strength levels (50% greater than mild carbon steel) N-A-X FINEGRAIN can be cold formed and drawn into difficult stampings and cold formed shapes.

Take these qualities and add the ability of N-A-X FINEGRAIN to be readily polished to a high luster at minimum cost, and when plated, you have a steel ideally suited for such applications as bumpers, bumper guards, and many others where strength and toughness with good finish is important.

Engineers and designers like N-A-X FINEGRAIN especially because its physical properties are inherent in the "as rolled" condition. No subsequent treatment is needed to insure its characteristics.

Check these other important advantages: N-A-X FINEGRAIN steel, compared with carbon steel, is 50% stronger • has high fatigue life with great toughness • is stable against aging • has greater resistance to wear and abrasion • is readily welded by any process • offers greater paint adhesion. NOTE: Where greater resistance to atmospheric corrosion is an important factor, our N-A-X HIGH-TENSILE steel is recommended.

For whatever you fabricate, from bumpers to bulldozers, with N-A-X HIGH-STRENGTH steels you can design longer life, or less weight, and economy into your products. Let us show you how.



One of many applications where N-A-X FINEGRAIN'S strength with formability saves production money.

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HIGH-STRENGTH STEELS

N-A-X Alloy Division, Dept. B-4

GREAT LAKES STEEL CORPORATION

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Great Lakes Steel Corp., Detroit 29, Mich.

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☐ Please have your representative contact me.

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52100

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STEELS, INC.

Union, New Jersey • Detroit, Michigan • Chicago, Illinois

(*Concluded from page* 81)

of a 27,000 sq-ft addition to the plant of a wholly owned subsidiary in Coventry, England.

American Can Opens Plant

American Can Co., New York, opened its beer can plant in Detroit. The 93,000 sq-ft facility can turn out 500 metal cans a minute on each of several production lines. F. B. Newcomb is vice president in charge of Central Division operations.

Thew Shovel Enters New Field

Thew Shovel Co., Lorain, O., is manufacturing a line of rubber-tired front end loaders in addition to its established line of power shovels and cranes. Loaders will be merchandised under the direction of W. H. Madden.

Mueller Making Metal Powders

Mueller Brass Co., Port Huron, Mich., has entered the powder metallurgy field. This is another step in the firm's long range program of product diversification, says Fred L. Riggin Sr., president.

Black & Decker Buys Plant

Black & Decker Mfg. Co., Towson, Md., acquired a 58,000 sq-ft manufacturing building at Rockville, Ont., and is equipping it for production this summer. This unit will operate as the Black & Decker Mfg. Co. Ltd.

Martin To Build in Florida

Martin Co., Middle River, Md., awarded a contract for a $6-million plant near Orlando, Fla. The 488,000 sq-ft facility will be used for the research, development, manufacture and testing of guided missiles, electronic and nucleonic items and small weapon systems.

Diecaster Boosting Capacity

McCulloch Motors Corp., Los Angeles, installed a second 800-ton, Lester-Phoenix aluminum and magnesium diecasting machine. A third machine is on order. The firm now has 19 diecasting machines, a little more than 50 per

(Advertisement)

HOW FLASH-BUTT RESISTANCE WELDING IS USED TO FABRICATE PRESSURE VESSELS

Severe test program proves Sciaky techniques of resistance welding provide the safe welds necessary for assembling butane gas containers

In a program undertaken to determine the metallurgical advantages of flash-butt welding for joining half shells of butane gas containers, Sciaky has established the suitability—and superiority—of the process for this application. The flash-butt process offers a 100% strength factor compared to 80% for flame or arc welds.

Job Description

Figure 1 shows the half shell and the assembled container. The metal is deep drawn low carbon steel. The

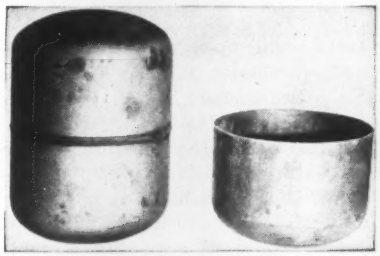

Fig. 1 At the right is a single half shell. At the left are the half shells joined by flash welding, flash not removed.

half shell has an I.D. of 11.6" and an O.D. of 11.8" or a cross section of 3.63 sq. in.

Special clamps were developed so that the clamping pressure could be applied to a maximum surface of the parts to be welded. End and side views of the clamp arrangement are shown in Figure 2.

The welder is a 300 KVA Sciaky Flash-Butt Welder with an upsetting force of 25,000 psi. Current is supplied to both the upper and lower clamping dies in order to assure uniform distribution throughout the diameter. One platen is fixed and the other movable. The flashing system is pneumatically operated and flashing time controlled by an adjustable metering valve.

A wedge cam provides the proper platen acceleration for flashing. A tap switch affords sixteen steps of heat regulation. Copper alloy clamping dies are used as locators and also serve as back-ups for the piece parts during the upsetting.

Test Results

The safety of the flash-butt welds was extensively tested under hydraulic pressure. Two such containers are shown in Figures 3 and 4 and for comparative purposes a fusion welded container in Figure 5.

Extensive metallurgical tests were also conducted from which the following conclusions were drawn:

1. Flash-butt welding makes it possible to obtain a strictly autogenous weld. This is true because the weld is made without the addition of extraneous material, and because the upsetting action displaces the melted base metal and impurities at the weld joint.
2. The flash-butt process makes it possible to obtain a joint having the same consistency on the inside and on the outside of the containers. See the macrographs, Figures 6 and 7.

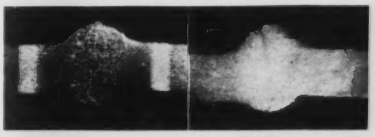

Fig. 6 Macrographs of flash welds before (left) and after annealing. Note consistency on both inside and outside.

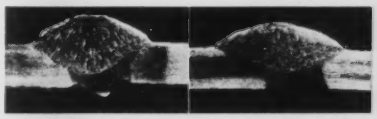

Fig. 7 Macrographs of arc welds before (left) and after annealing. Note irregularities on inside due to lack of penetration of extraneous material.

Complete Report Available

A complete, detailed report with extensive illustrations and the results of additional tests is available without charge. Please write on your company letterhead asking for the *"Engineering Report on Resistance Welding of Butane Gas Containers."* There is no obligation.

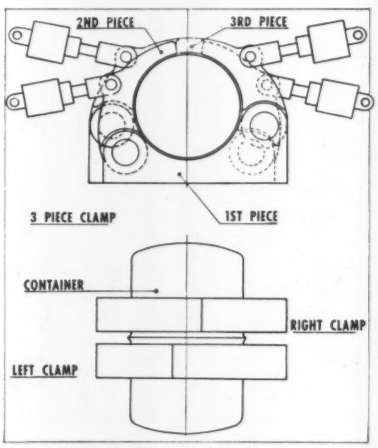

Fig. 2 Clamps for joining half shells.

Fig. 3 Flash welded and annealed container which burst at 1349 psi. Weld elongation was 29.6%.

Fig. 4 Flash welded and annealed container which burst at 1278 psi. Weld elongation was 24.3%.

Fig. 5 Fusion welded and annealed container which burst at 994 psi. Weld elongation 11.6%.

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PIONEERS IN ALLOY CUSTOM FABRICATION

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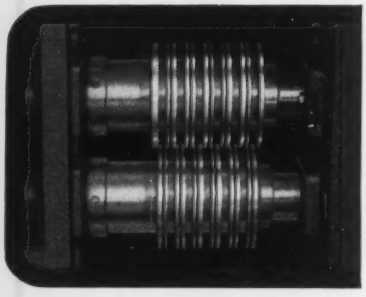
For maximum satisfaction, specify Cowles, world's largest manufacturer of rotary slitting knives. Furnished in



any face, diameter and bore, in our **Max-Cut; Special Alloy; Super Alloy; Circle C; Super C;** or any special analysis for slitting high and low carbon steels, stainless, silicon or non-ferrous metals. Prompt delivery!

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ROTARY SLITTING KNIVES • SPACING COLLARS • ROTARY TRIMMING KNIVES • ROLL TURNING TOOLS • EDGING ROLLS • CUT-OFF KNIVES STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.

cent of the planned total. McCulloch makes chain saws, target aircraft engines, automotive superchargers and outboard motors.

Pressmaker Builds Plant

Dake Corp., Grand Haven, Mich., is building a $500,000 plant at 724 Robbins Road, Grand Haven Township. The company specializes in the manufacture of hydraulic, utility and arbor presses.

Inland Steel Products Expands

Inland Steel Products Co., Milwaukee, is installing a slitting department at its Baltimore plant as an adjunct to its fabricating work. The company plans to build a plant at Sparrows Point, Md., in about two years.

Will Open Branch Warehouse

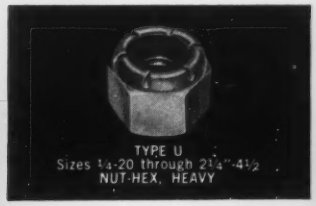
By early August, the Warehouse Division of Atlantic Steel Co., Atlanta, will open a branch office and warehouse at 4230 First Ave. S., Birmingham, Ala. F. E. Saucier Jr. will be branch manager. Inadvertently, the location of the new warehouse was given as Atlanta in a previous issue of STEEL. Initially, the Birmingham warehouse will stock only Kaiser aluminum products. A full line of steel warehouse items will be added later.

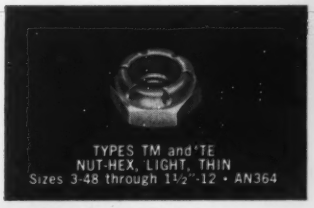
ASSOCIATIONS

Officers of the **American Society for Testing Materials,** Philadelphia, for the coming year will include: President, R. T. Kropf, Belding Heminway Co. Inc., New York; vice president, F. L. LaQue, International Nickel Co. Inc., New York.

Ernest Hart, Food Machinery & Chemical Corp., San Jose, Calif., was elected chairman of the **Manufacturing Chemists' Association,** Washington. Harry B. McClure, Union Carbide Corp., was elected chairman of the executive committee. Gen. J. E. Hall (USA ret.) and M. F. Crass Jr. were re-elected full-time president and secretary-treasurer, respectively. R. L. Murray, Hooker Electro-

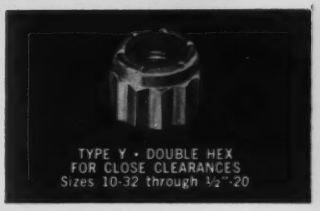
How does ESNA's complete line turn your special hex nut requirements into standard parts?


TYPE U
Sizes ¼-20 through 2¼"-4½
NUT-HEX, HEAVY

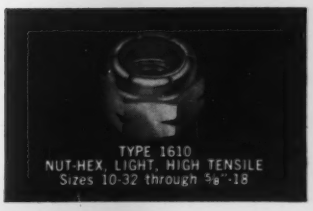

TYPES TM and TE
NUT-HEX, LIGHT, THIN
Sizes 3-48 through 1½"-12 • AN364

TYPE TU
Sizes ¼-20 through 2¼"-4½
NUT-HEX, HEAVY, THIN

TYPES M and E • NUT-HEX LIGHT
Sizes 1-72 through 1½"-12
AN365


TYPE Y • DOUBLE HEX
FOR CLOSE CLEARANCES
Sizes 10-32 through ½"-20

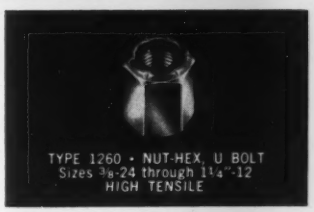
What happens when design or production requires a variation on a standard self-locking hex nut? Can you find a source quickly and economically? You can if you call on ESNA, because ESNA's *standard* line of hexagon nuts includes hundreds of dimensional, material and tensile variations. Probabilities are that one of them will meet your requirements.


TYPE 1610
NUT-HEX, LIGHT, HIGH TENSILE
Sizes 10-32 through ⅝"-18

Every nut illustrated here is a standard part. They range in size from a sub-miniature 0-80 thread that is only .107" across the flats to a 4"-4 thread that is 6⅛" across. Thread series include SAE, USS and British BSF, BA and Whitworth series. Most are available in carbon steel, stainless, brass, and aluminum. The locking effectiveness of the red locking collar of an Elastic Stop nut has been tested and proved by more than thirty years of actual field service on locomotives, pile drivers, oil drilling machinery and washing machines, truck and tractors. Elastic Stop nuts do not gall or seize bolt threads; they can be re-used many times.

TYPE 1660 MINIATURE
Sizes 0-80 through 4-48

These standard ESNA hex nuts are available from stock or are produced under normal lead times. And, of course, additional hundreds of "specials" are also available. The next time you need either a standard or an unusual hex nut call ESNA, the company that makes the most complete line of self-locking nuts available to American industry.


TYPE 1260 • NUT-HEX, U BOLT
Sizes ⅜-24 through 1¼"-12
HIGH TENSILE

For details on the Elastic Stop® nuts shown here, write Dept. N43-660.

ELASTIC STOP NUT CORPORATION OF AMERICA

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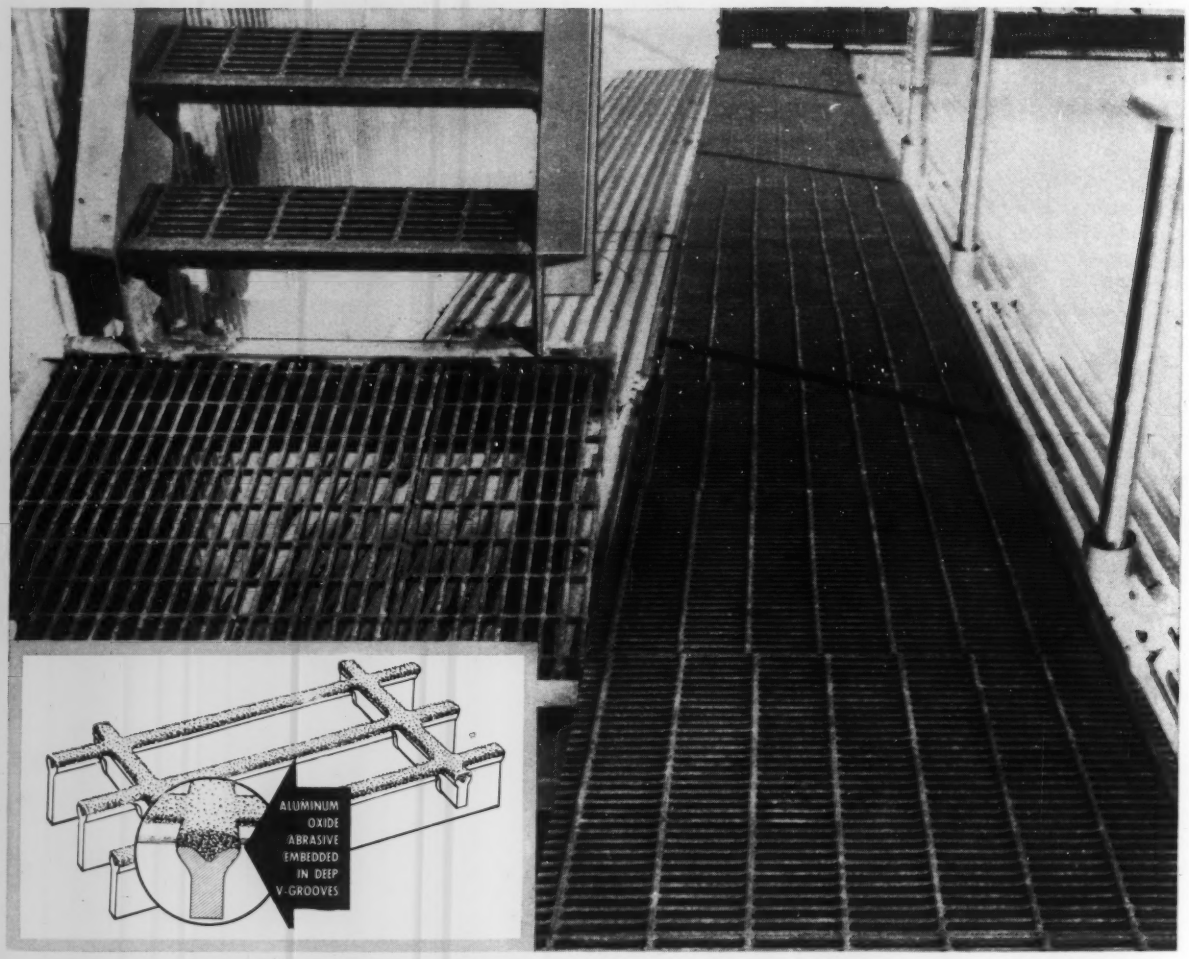
TYPE NKM-NKE
NYLON CAP-LIGHT-HEX NUT
Sizes 6-32 through ½"-20



RELGRIT® provides safe footing on sharply sloping roofs at AEC St. Louis Plant

Reliance Relgrit gratings and treads are providing safe access to stacks, filters and other equipment across the 18° sloping roof of the AEC Feed Material Plant near St. Louis. The abrasive surface of Relgrit was picked as a truly non-skid surface for ramps, stairways and walks leading to equipment which had to be serviced frequently.

The top surfaces of the bearing bars have 1/8" deep V-grooves in which is embedded aluminum oxide abrasive grains in a hard resin. The material is not affected by water, oil, gasoline, greases, or the most commonly used acids, alkalis and other chemicals, which gives it a long service life under the most severe conditions. If you have operations in which the floors become oily, greasy, wet, or slick from any other cause, Relgrit can provide safe footing at very low cost. Write for complete information and samples.

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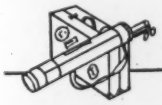
Relgrit Abrasive Gratings and Treads • Lightweight Bridge Flooring
Steel, Stainless and Aluminum Grating • Steel Mill Equipment

chemical Co., Buffalo, and D. S. Frederick, Rohm & Haas Co., Philadelphia, were elected vice presidents.

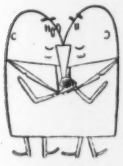
NEW ADDRESSES

Structural Fibers Inc., formerly of Bedford, O., moved into a building with 12,000 sq ft of office space and manufacturing facilities at Fifth avenue, Chardon, O. The firm makes reinforced plastics products.



VACATIONS

Fostoria Pressed Steel Corp., Fostoria, O., will close its plant from July 29 through Aug 11. No shipments will be made during that period.



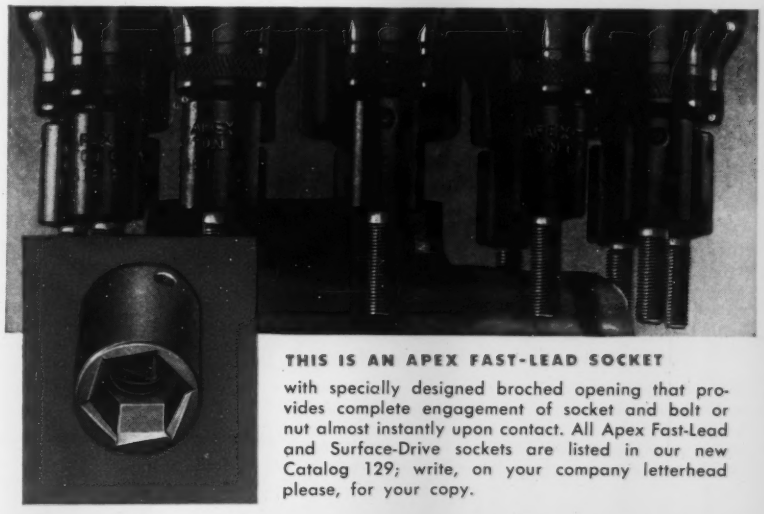
CONSOLIDATIONS

American Safety Razor Corp., New York, purchased **Com-Air Products Inc.**, Los Angeles, producer of fuel controls.

Unitronics Corp. and **Hufford Corp.** will merge with **Siegler Corp.**, the surviving company, subject to approval of stockholders. The new corporation will have manufacturing plants in California, Illinois, New York and New Jersey with headquarters at Siegler's executive offices, Anaheim, Calif. Siegler makes electronic and heating equipment, woodworking machinery and juvenile specialty items. Unitronics of Long Island City, N. Y., makes radio, television and high fidelity sets; electronic and recording equipment. Hufford of El Segundo, Calif., makes stretch forming equipment, special machinery and material handling equipment.

American Smelting & Refining Co., New York, acquired Enthone Inc., New Haven, Conn., manufacturer of metal finishing specialties and equipment. Dr. W. R. Meyer will continue as president of Enthone while M. R. Herman will be vice president.

In less time than you took to look at these two photos, 12 hex head bolts can be run down snugly and another pump unit assembled. This is modern fastening, using NEW multiple-unit power tools and NEW Apex Fast-Lead Sockets, specifically designed for split-second assembly.



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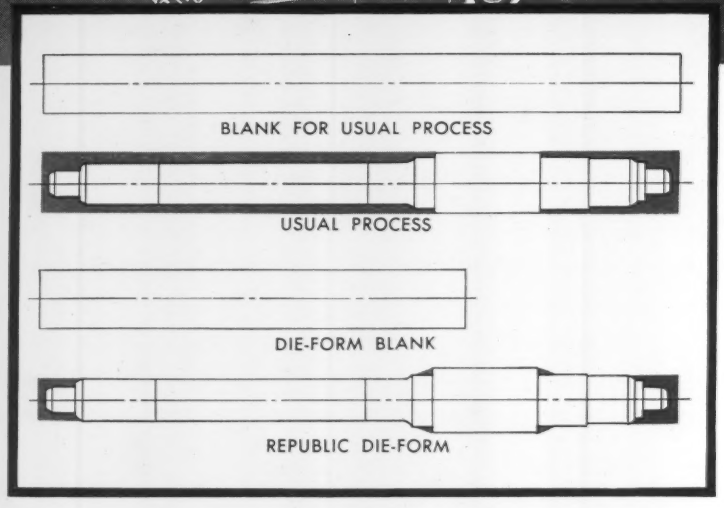

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when you specify Republic Die-Form for high-volume production of multi-diameter machine shafts. Drawings and photographs show dramatic savings actually made possible in an automotive transmission shaft. In this case, 200 tons of cold formed blanks produced parts formerly requiring 300 tons. Machining time was reduced accordingly.

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What It Is. The Republic Die-Form process is a new method of cold forming hot rolled carbon, alloy, or stainless steel bars into multi-diameter bars ready for final finishing.

What It Does. Use of Republic Die-Form instead of conventional bar stock permits major savings in time, steel, and money in mass produced, multi-diameter machine shafts. Since Die-Form closely approximates the final part, only finishing cuts and/or grinding are required for completion. Scrap loss is minimized—production rate increased.

Savings in time and steel mean dollar savings. However, costs may be further reduced through decreased capital investment in machine tools, and elimination of excess weight-handling costs in raw material and scrap disposal.

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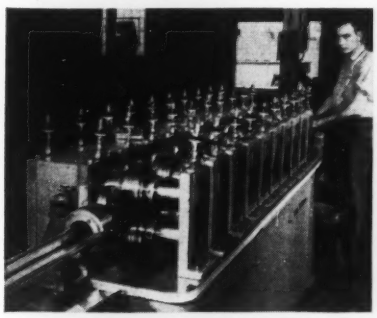
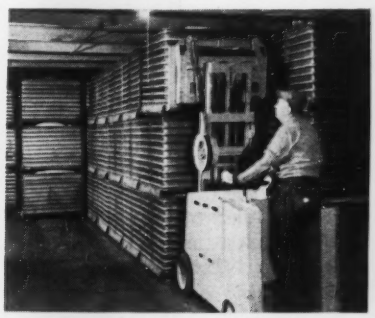
Plan now to check the savings potential of Republic Die-Form in your machined shaft production. Contact your Republic office for full details. Or write for illustrated literature, ADV-746.



SAVE PAINT PREPARATION COSTS on your formed steel products by specifying Republic Electro Paintlok®. Special paint-holding surface is applied at our mills. It won't crack, flake or peel, even under severe bending, as demonstrated by this acoustical fastener forming operation. Final finish can be applied immediately, with excellent results. Mail coupon for data.



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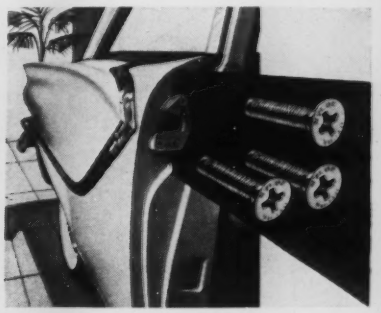

LIFESAVING DOOR LATCH striker plate is permanently anchored to door post with Republic Nylok® Bolts. Nylon pellet in body of bolt forces strong metal-to-metal lock between opposite mating threads. Resiliency of pellet provides excellent adjustability and re-use characteristics—and provides liquid seal when bolts are seated. Send coupon for facts.

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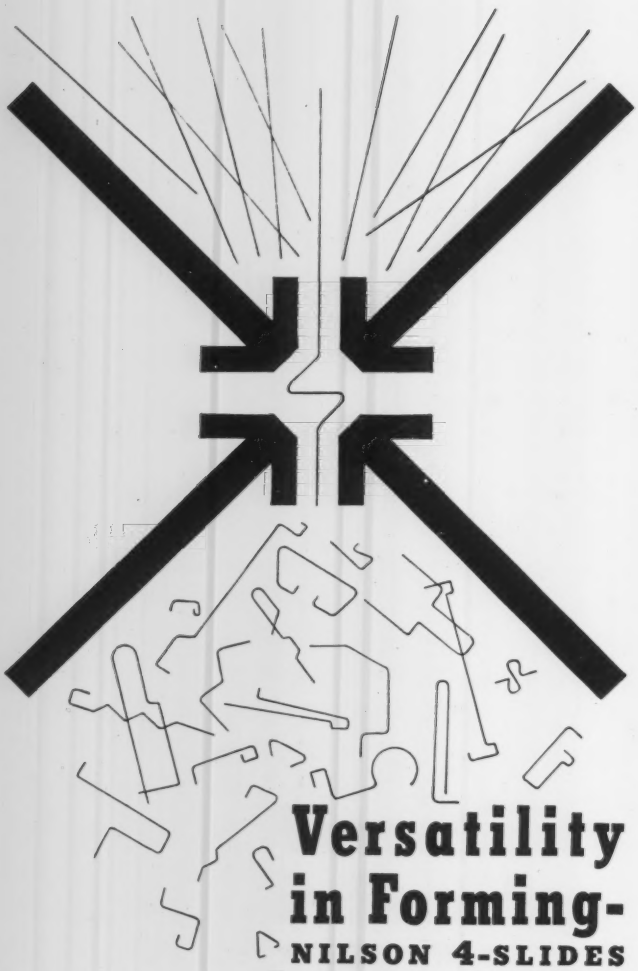

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Simple or complex metal forms in wire or ribbon metal is no problem on a Nilson. Tooling for basic forming can be augmented by provision for operations such as welding, assembling or swaging. Open design on all forming elements provides for quick tool change and easy adjustment even from wire to metal forming on the one machine that does so many jobs so well. The universal Nilson 4-Slide is the economical answer to your forming problems. Size ranges—wire up to ½" dia. in feeds to 32" max., ribbon stock up to 3½" wide. 5 to 75 ton press sections. Our specialists can assist you in all types of forming requirements.

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Get Set for Metalworking's Fabulous Future . . .

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● Half of metalworking's growth in the next five years will come from products not yet introduced. Industrial research has become a must for corporate growth—even survival.

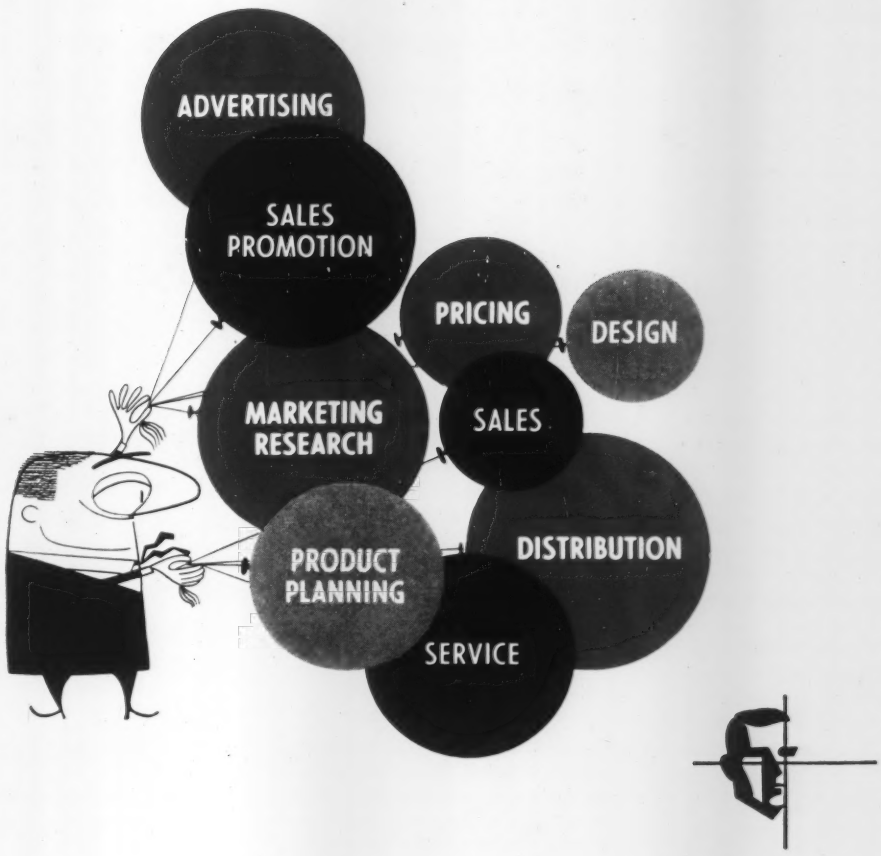
How do you research for profit? How can you tailor new products to success? What is management's role in research administration?

In its July 15 issue, STEEL will answer these questions and many more.

Find out what you can do to get a bigger return for your research dollar; learn how to integrate research programs with company goals and with production and sales know-how. The sixth installment in STEEL's 1957 Program for Management, appearing next month, is one of a ten-part series. Articles published to date:

1. **The Care and Feeding of the Junior Executive**
   (Feb. 11, page 93)
2. **Grooming Middle Managers**
   (Mar. 18, page 93)
3. **Profit Sharing**
   (Apr. 15, page 115)
4. **Inventory Management**
   (May 13, page 109)
5. **Managing Our Markets**
   (June 17, page 93)

Extra personal copies of these Program for Management articles are available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.



Managing Our Markets

NEEDED: An industrial St. George to wrestle with a three-headed dragon:

1. Markets are growing so explosively that you must marshal your best judgment and reflexes to tell how much you can sell and how much you can expand to keep even or go ahead of competition.

2. Costs are rising so rapidly that you must sell all you produce.

3. Despite the long-term expansion prospects, you must cope with periods like the present when competitive factors have forced capacity ahead of demand in many cases. (We'll produce and sell 120 million tons of steel at best this year, but we have the capacity to make 133 million. We can make 9 million or 10 million cars, but we'll do well to sell 6 million.)

Your St. George may not be one man, but a team — metalworking marketing managers co-ordinating plans to meet the problems of higher costs, larger markets and keener competition. They're turning out at marketing seminars in record numbers. They're restructuring company marketing organizations. They're evolving a new concept of marketing.

Armed with the new concept, your team will have a darned good idea of who your customers are, what they want, when they will buy and how much they will pay. In the process, you will be able to co-ordinate production and sales. You will be truly managing your markets.

Marketing: A Definition

Simply put, marketing is finding out what the consumer wants and selling it to him at a fair profit.

The new concept implies the integration of all functions in find-

ing out what is wanted, measuring the demand, planning the product and moving it to the final user.

General Electric Co. explains its approach this way: "The new plan introduces the marketing man at the beginning rather than at the end of the productive cycle and integrates marketing into each phase of the business. Thus marketing, through its studies and research, will establish for the engineer, the designer and the manufacturing man what the customer wants in a given product; what price he is willing to pay; and where and when it is wanted. Marketing would have authority in product planning, production scheduling and inventory control, as well as in sales distribution and servicing the product."

New Jobs—Hundreds of metalworking companies are moving in this direction. Every week brings evidence through the creation of such new posts as vice president-marketing and the coordination of these marketing functions in a separate division: Customer research, marketing research, product planning, advertising and sales promotion, marketing personnel training, public relations and sales.

The new look in marketing does several things:

1. It integrates all the marketing functions under one head.

2. It introduces objective techniques and measuring devices into an area that was dependent on hunch and intuition. It makes possible the more effective use of the better marketing data being made available.

3. It shifts the emphasis from production to marketing. It enables the top marketing executive to say to production: This is what we are going to sell; make it.

4. It places responsibility for profits on marketing. Too often in the past—and the present—the prime responsibility of sales has been volume. Volume has gone up without an accompanying rise in profits. Profits as a percentage of the sales dollar have been going down.

Advocates of the new concept believe that it may be the greatest advance in professional management in the next decade or two. They think it has the potential to correct some of the defects in our economic system. They say it will help level out the peaks and valleys in the economic trend lines and permit fuller exploitation of our economic potentialities at the same time.

The Challenge — Metalworking markets will continue to expand, spurred by an upsurging population, an accompanying increase in family formations and ever-advancing per capita demands. The most conservative estimates indicate the metalworking market will double in the next 20 years.

But capacity to produce also will grow. Galloping technological developments require that capacity increase to bring into effect the efficiencies of modern equipment and processes. New plants are being built. Old ones are being expanded. (For the last 20 years, we have been building new metalworking plants at an average rate of 2400 a year.)

When you add up the facts, you arrive at this answer: Consumption will increase, but capacity to produce will stay ahead. It means that marketing people have their work cut out for them.

Metalworking Sales UP

1954	$106 billion
1955	128 billion
1956	134 billion
1957	145 billion
1965	196-242 billion
1975	273-372 billion

Future sales estimated in 1957 dollars. Lower figure assumes level per capita consumption. Higher figure assumes continuing increase in per capita consumption at postwar rate.

No Open Sesame

Let no one believe that the transition to an integrated setup is easy, particularly in an established company. Scores of metalworking managements, impressed by the trend toward marketing, have gone through the motions of setting up marketing managers or vice presidents in charge of marketing and expected to reap the benefits of integration. Usually, they have been disappointed.

Nearly all the successful changes have been gradual, the result of evolution. Four steps are involved:

1. Winning an understanding and acceptance of the concept which starts at top management and filters down to middle management in all departments.

2. Planning an extensive organization which will permit the co-ordination of all pertinent functions.

3. Recruiting and training competent personnel for the staff.

4. Developing controls that permit people to make their maximum contributions.

Marketing authorities say fail-

More Metalworking Plants

MORE COMPETITION

1937	26,400 plants
1947	51,900 plants
1957	72,000 plants

MORE CUSTOMERS

More than 2000 metalworking establishments come into being each year. They offer larger sales opportunities for industrial marketers; they also offer keener competition in supplying the market.

ure in any one of the steps is likely to cause the whole structure to crumble. They find it difficult to say which are the most important. They believe all are difficult.

Tall Hurdle — Members of the new school sometimes are impatient over the reluctance of their top managements to fully accept and support the new concept. Many presidents and executive vice presidents came up through sales. Since integration makes sales a part of marketing, managers who came up through sales are likely to be suspicious. Top management that advanced via production is only slightly less resistant. Professionally trained managers or those who rose to top positions through finance are more likely converts.

Many presidents believe that marketing is more than a division of management. They hold, with Peter Drucker, that management is marketing and vice versa.

Charting — Setting up the organization plan will depend on many factors—the total company organization and policy, the personalities involved and the objectives. There is no formula, no typical marketing organization. The structure is a custom job.

The principles are the same as those of any organization plan: Jobs must be defined and analyzed; lines of authority and responsibility must be clearly delineated; channels for interdepartmental communication and co-operation must be marked.

Right People—Obtaining fully qualified personnel for key positions may be the most important and difficult phase. People with the required specific and over-all know-how are scarce.

The department head most often will come from sales. But he also may come from marketing research, advertising or finance. Preferably he should have experience in several functions. It will help him as a co-ordinator.

Specialists may have to be recruited from other fields for the simple reason that there are none or not enough connected with marketing. Customer research, for example, may call for the use of trained psychologists.

While business schools are turning out an increasing number of graduates with marketing training, they are still a long way from being seasoned, and there aren't enough to go around.

A Chicago advertising man fed up with talk about the shortage of engineers made a study of the classified sections of metropolitan Sunday newspapers. He found that the demand for marketing men is greater than that for engineers.

Safety Factors—Any function as new as marketing and holding the attraction of quick growth is bound to attract some questionable characters. Unless goals and objectives are carefully defined and effective means of controlling marketing activities are established, you can expect some expensive dissipation of time and money. Management will have to be pretty hardnosed in controlling marketing activities.

Brass Tacks—So much for the broad outlines. Here are some of the bread-and-butter details.

Management consultants suggest a program of planned evolution. Some benefits can be gained now. Others should wait until developments warrant them.

Finding Out

The essence of the new approach lies in finding out, discovering more about what the customer wants.

Richard D. Crisp, Chicago management consultant, says: Look at the successful firm. The important flow is not from the manufacturer to the customer. It's the reverse. The company makes products its customers want instead of those somebody in production, or in engineering, or research, or in the president's office thinks they ought to want.

Industrial companies generally are closer to their customers than are consumer goods manufacturers. The relationship makes easier to find out what the customer wants if the manufacturer really wants to know.

Better Data—The manufacturer will want to find out where the markets are, where they are expanding most rapidly. He will want to find out which industries hold the greatest potential. He will want to find out what size companies offer profitable markets.

A great amount of such data

Why Metalworking Markets

More People

1957	168 million
1960	178 million
1965	190 million
1975	221 million

Bigger Appetites

(Per capita consumption of metalworking products)

1950	$ 620
1956	804
1960	1,070
1965	1,275
1975	1,685

Projections are in constant 1957 dollars.

is available for free or at nominal cost. You can get a mass of useful statistics on the metalworking industry through the federal government's Standard Industrial Classifications. Private agencies put the information into an easier-to-use form. STEEL's new book, *Metalworking Markets in the U.S.A.*, presents a wealth of up-to-date facts on metalworking plants employing 20 or more, based on this magazine's continuing census of the metalworking industries. Companies in this category account for more than 96 per cent of metalworking's dollar volume.

Avoid Waste — Such data can help metalworking manufacturers overcome the problem of misdirected sales, advertising and sales promotion efforts. As N. R. Ladabouche, STEEL's research director, points out, such mistakes are usually made by sales territories, by industries, by line of product and by size of customer. The census volume, used with relatively simple marketing research, distribution cost and sales analysis, is designed to minimize this waste and lead the way to overlooked markets.

Trade associations and quasi-public organizations of many kinds also offer statistics and data to aid the manufacturer.

Pinpointing — Marketing data we have been talking about generally do not give the manufacturer or his marketing division all the answers they want. Usually needed are specific marketing research and an interpretation of statistics. Whether the work is done by the company's research department or by consultants, it can be an excellent investment.

A few months ago a manufacturer of hydraulic equipment was persuaded to undertake a survey of users of the type equipment he makes. Sales management was reluctant. They contended they had good information on all users through their prospect list, that their salesmen regularly called on all companies on the prospect list and fed back all the data needed. A mail survey showed that 37 per cent of the companies on the prospect list used no hydraulic equipment or made no product on which hydraulic equipment of the type in question could be used. A second study is turning up prospects for sales the company did not even suspect existed.

While marketing research can-

Will Grow

More Money To Spend

(Per capita disposable personal income)

1947	$1,173
1957	1,779
1965	2,300
1975	3,100

not provide automatic or mechanized sales management, it does narrow the zone of uncertainty. Research offers the natural way to find out who the customer is, what he wants, when he will buy and how much he will pay.

An Attitude—Finding out is the philosophy of modern marketing. It is a state of mind, an attitude. It also is the logical first step in marketing, regardless of organization.

How Koppers Does It

It is step No. 1 in marketing at Koppers Co. Inc., Pittsburgh. While the finding out effort is spearheaded by the marketing research staff, the collecting of information is not confined to those who do marketing research per se. Many people, especially field salesmen, serve as intelligence agents.

Finding out about the customer and what he wants precede product planning and the setting of general management objectives and plans.

Ralph Winslow, vice president and manager, marketing department, explains Koppers' marketing philosophy: "No matter what the board of directors may want to do, good and attainable objectives cannot be set unless we start with the customer."

Areas considered in step No. 2 include profit, growth opportunities, product lines, volume, distribution channels, organization and policies and methods.

Step No. 3 is product planning—what the company will offer the market.

Step No. 4 is market planning, the correlation of the intelligence gained in the preceding steps which results in a plan of action.

The next step is programming, or detailing the plan of action.

Koppers calls the integrated marketing program step No. 6. It co-ordinates sales, advertising, sales promotion, public relations and personnel and training programs. The plan specifies by product, market and channels of distribution exactly who will do what, where, when and how to assure the marketing plans and programs are executed effectively.

Finally, comes the field sales action, the point at which the whole marketing effort must develop its full power. This is where the marketing investment does or does not pay off.

Training Personnel

Any program is only as good as the people managing it. Koppers is sponsoring a series of marketing management seminars at Princeton, N. J. Started nearly two years ago, they began with division general sales managers and several members of the centralized marketing staff.

Each seminar runs three weeks and is conducted by a professional chairman and a staff of 18 conference leaders chosen from industry and universities.

The territory covered includes a study of principles and an analysis of Koppers' problems or case histories.

Mr. Winslow believes several benefits stem from the seminars. They help managers understand the company's marketing process, establish a common vocabulary and aid in integrating the work of line and staff.

Make Your Own—Since the supply of competent marketing personnel is limited, more companies are studying means to develop their own skilled marketing managers.

Few educational institutions have curriculums specifically aimed at staff positions in marketing. And most educators and businessmen agree that specialized training should not be emphasized heavily in the universities. It must come from experience and tailored

How Deep Do You Want To Go?

• A relatively few metalworking plants account for the major share of total metalworking buying, production and employment. The table below, from *Metalworking Markets in the U.S.A.*, published by STEEL, shows that those plants employing 20 or more represent only 35.5 per cent of the total number. Yet they account for 96.1 per cent of all metalworking business. Figures are adapted from the U.S. Bureau of the Census and are for 1954.

Statistics like these can help the marketer selling to metalworking select the areas of greatest potential.

Plants Employing	Number of Plants	Per Cent of Plants	Per Cent of Business Potential	Cumulative Per Cent of Plants	Cumulative Per Cent of Business Potential
2,500 or more	376	0.6	33.9	0.6	33.9
1,000-2,499	780	1.1	18.6	1.7	52.5
500-999	1,229	1.8	13.1	3.5	65.6
250-499	1,994	2.9	10.6	6.4	76.2
100-249	4,214	6.2	9.9	12.6	86.1
50-99	5,193	7.6	5.3	20.2	91.4
20-49	10,412	15.3	4.7	35.5	96.1
10-19	10,345	15.2	2.0	50.7	98.1
5-9	10,929	16.0	1.1	66.7	99.2
1-4	22,731	33.3	0.8	100.0	100.0
Total all plants	68,203	100.0	100.0		

instruction after the man is on the job.

Companies with planned management development programs are including market training. The need for better trained men is directing attention to management development programs among those companies which do not have formalized plans.

Job Rotation — Shifting junior and middle managers from job to job to broaden and develop their skills and experience is particularly useful. It further blurs the distinction between line and staff jobs. Many marketing men think that shifts from line to staff and vice versa strengthen manpower in either area and result in better understanding and better co-operation on the job.

Meetings—Sales meetings offer a natural training tool. They give you the opportunity to present information of real value and to plan for a dramatic presentation.

Many companies are using skits to portray marketing cases or situations.

Coaching by a superior, used generally in management development programs, is particularly effective. It affords a means of linking theoretical knowledge with experience and business situations.

Outside Facilities — Executive development courses at universities are being broadened to give more emphasis to marketing.

The American Management Association sponsors an advanced marketing management course and holds a number of marketing conferences.

The National Sales Executives sponsors a course at Rutgers. The National Society of Sales Training Executives, the National Industrial Conference Board, the Society for the Advancement of Management and many other organizations are lending aid in the training of marketing personnel. They offer excellent opportunities not only to learn the principles of modern marketing but also to become advised in detail on what other progressive companies are doing.

Promise of Marketing

While scores of metalworking companies are integrating their marketing functions, the acceptance of the concept is proceeding slowly. Practical marketing men say this is normal and good. They freely admit that one of the obstacles to acceptance is the Mumbo Jumbo of some practitioners of marketing.

Says Richard C. Christian, executive vice president, Marsteller, Rickard, Gebhardt & Reed, Chicago: "Too many of the millions of words being spoken and written about marketing are too long, too obscure, too confusing and too stuffy. The central meaning and practical usefulness of marketing is too often buried beneath a cumbersome baffle-de-gab and gobbledygook. Too many practitioners of marketing talk not like businessmen but like witch doctors. There are those who speak of marketing always with a capital 'M,' with a bright and superficial glibness as though it were a brand new miracle ingredient like irium or GL-70 —just sprinkle a little on the sales manager's martinis and miraculously cure the gray sickness of anemic sales."

Move the Malarky—Marketing is neither a miracle nor a mystery. The best students believe there are substantial and practical benefits to be gained by upgrading the total marketing function, by integrating its components, by applying all the scientific measuring and finding out devices, by making better use of available data on the markets and, above all, by paying heed to the customer.

Here are some of those benefits:

Profits — Under the integrated system, marketing assumes responsibility for profits. By entering the cycle before production starts, by influencing product planning and design, by participating in budgeting and pricing, market-

ing exercises control over costs. The emphasis is shifted from volume to profitability.

Balance—Starting with the war years, metalworking has made tremendous strides in technology. We have arrived at, or are near, the production breakthrough. We can make almost anything we want to make in any quantities we want.

Consumption also has made mighty gains. An unexpectedly large population growth, an increase in per capita consumption and higher personal disposable incomes give us more buyers with larger appetites and the money to satisfy them.

With such odds in our favor, what could go wrong with our economy?

If we could keep production and consumption in balance, there should be no trouble. But that situation is lacking at times. If consumption runs ahead of production, we have a sellers' market and that's just dandy for those lucky enough to be on the sellers' side.

But when production gets ahead of consumption, as it does with fair frequency, we have troubles in the form of inventory recessions and economic slumps.

For generations, economists and businessmen have been looking for some means to keep production and consumption in balance. The Europeans use cartels. But they tend to make markets static if not stagnant. During the early thirties, we tried a form of cartel under the National Recovery Act. Later, we applied other production controls. None was satisfactory. None was acceptable to business which prized freedom and competition.

Now the exponents of modern marketing say they may have the answer. If we can determine in advance what we are going to sell by knowing more about the market and then produce to the demands of that market, we are managing our markets.

For the economy as a whole, such a happy state of affairs could mean economic trend lines without deep valleys. For the individual corporation, it would mean it would not be caught with large inventories of goods manufactured but not sold—goods that have to be dumped on the market at reduced prices.

Evidence: A leading television producer sold more than a half million sets last year. When new models were introduced, he had less than 2000 old sets on hand. The firm's marketing department is given credit for the enviable position. It advised production on schedules on a month-to-month and on a model-to-model basis.

Consumer—Modern marketing is keyed to the customer's wants and needs. To the extent that his desires are ascertained and heeded, the customer is going to get more nearly what he wants when he wants it and at a price he is willing to pay.

Marketers—As the new concept is accepted and adopted, the individual in the marketing function—marketing research, advertising, product planning, customer research, sales production, sales and distribution—will have to sharpen his techniques. He will have to develop greater skills and use the tools at his disposal more intelligently.

But it will be well worth the

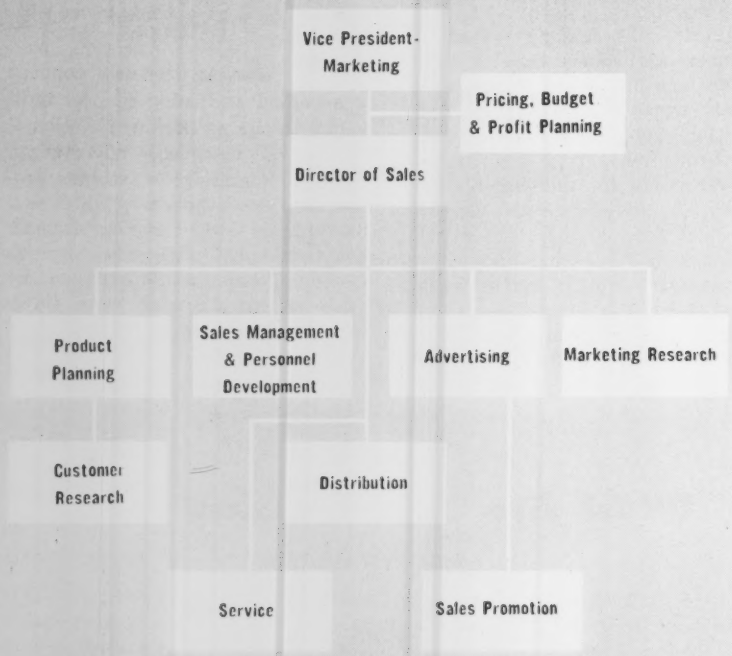
What Are You Looking for?

SALES VS. MARKETING

• Many a sales manager is functioning as a marketing manager and in the new concept of marketing would be the logical choice for manager of marketing or vice president-marketing. Many others function as field sales managers.

In the opinion of marketing men, there are several differences between sales managers and marketing managers. The consensus, as interpreted by STEEL:

SALES MANAGERS	MARKETING MANAGERS
Experience	
Comes from selling.	May come from sales, marketing research, advertising or financial departments.
Mental Adaptability	
Quick. Covers lot of ground fast. May sacrifice accuracy for speed.	Deliberate and cautious. Wants to make sure he is right before acting.
Social Intelligence	
Sizes up people quickly in face-to-face situation.	Judges behavior in the mass.
Reading Habits	
May be comparatively weak in comprehension. Man of action.	Does wide and varied business reading.
Interests	
Personal selling and volume.	Varied, including product development, promotion, budgeting and all elements of distribution.



How To Organize the Marketing Function

• Companies that have adopted the new concept present a bewildering array of structures. They vary with the type of organization, its products, personalities and historical organization structure. Few marketing men interviewed by STEEL could agree on a formal organization chart. The one presented above represents only a consensus of the functions that should be included in the marketing division. Since no chart can be universally applicable, the above is intended only to represent building blocks that can be used.

effort. Marketing will assume a higher management status. And all the people in it will be able to grow in stature.

Road Ahead

A. A. Togesen, vice president in charge of marketing, Bulldog Electric Products Co., Detroit, states the case this way:

"The statement has been made that the art of placing industrial goods in the hands of the consumers lags more than ten years behind the industry's ability to produce goods. This is a challenge and an opportunity, since the great production possibilities can't help but arouse an awareness that a revolution in marketing procedures is required to keep up with production.

"American industry and enterprise are right now in the middle of the biggest battle in the history of business for the biggest stakes in the history of business. Both national income and money in circulation are at all-time highs—and so is the production of goods and services. This scramble for a share of the buyer's dollar, which was never more intense, is taking place while we, in the marketing phase of business, are confronted with some serious problems which are not diminishing. Rather, they are becoming graver, and they will continue to do so until we appraise them and find a means of solving them.

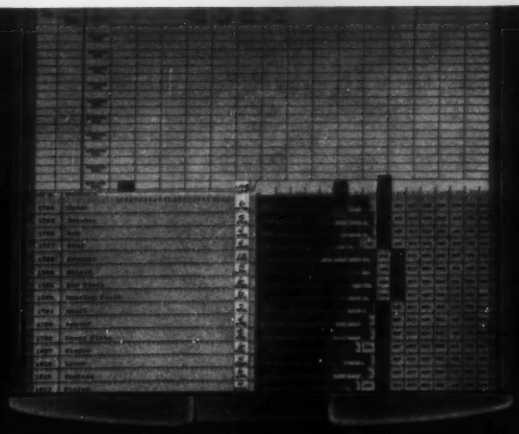
"Our major problem today is to utilize our available sales force more efficiently. Unlike our production friends, we cannot supplement our salesmen with machines; sales will continue to be made on a person-to-person basis. But we can materially improve our marketing techniques by utilizing the abilities of the specialists most of us have in our own organizations.

"My experience indicates that most of our sales executives are literally bursting at the seams. They are overworked; they need relief. In too many instances, the sales manager is charged with every conceivable responsibility concerning marketing, solicitation, advertising, sales promotion, sales service, pricing, research, statistics, sales training, product knowledge, competitive information, complaints, product bulletins and so on. Is this practical and realistic in these days of violent competition? Has the sales manager sufficient time to fulfill all these assignments—and to do necessary planning as well? Can he manage his staff and his salesmen so as to develop a strong sales department rather than a demoralized one? Or can we arrive at a more orderly plan, one which will aid the sales manager, his staff and the salesman?"

Mr. Togesen concludes: "If our present operations and procedures are unrealistic and unsuited to today's requirements, it seems ridiculous to perpetuate them."

Amen—We concur 100 per cent, and add: The integrated approach to marketing seems to be the only way out. Unless production is geared to demand of known quantity and quality, sales will continue to be a whimsical variable. We never will be able to manage our markets.

facts and figures at see level...



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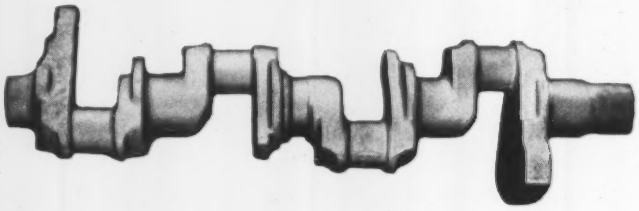
whether you think in terms of

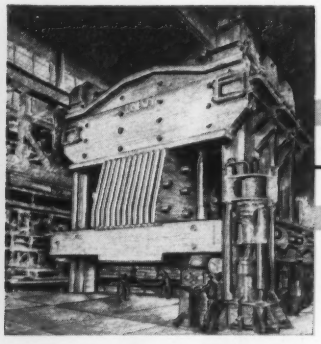
Horsepower

— or —

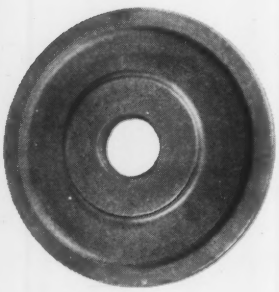
Thrust

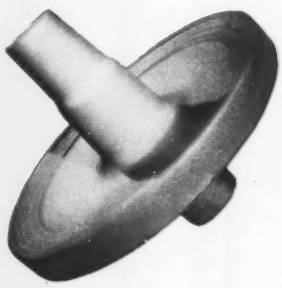


The crankshaft is the backbone of the piston-type engine. Illustrated above is the crankshaft forging for the most powerful piston-type aircraft engine ever produced.



At the bottom left is a turbine disc forging made from high density heat resisting alloy, and next to it is a titanium compressor wheel forging for two of the most powerful jet engines yet produced.





The history of Wyman-Gordon's contribution to aircraft progress dates from the inception of the "flying machine". The jet age is now calling on the unparalleled resources of Wyman-Gordon, which include the widest range of hammer and press equipment and the greatest technical know-how in the industry. Larger and more intricate forgings than heretofore available of aluminum and magnesium are being produced on presses up to 50,000 ton capacity, and giant hammers are fulfilling the growing need for forgings of titanium, high density materials or so-called super alloys. Now, as for nearly 75 years, there is no substitute for Wyman-Gordon experience and ability for — Keeping Ahead of Progress.

WYMAN-GORDON COMPANY

Established 1883

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL • TITANIUM

WORCESTER 1, MASSACHUSETTS

HARVEY, ILLINOIS • DETROIT, MICHIGAN

STEEL

June 17, 1957

Technical Outlook

TOOL LIFE—You may gain in a switch from brazed to disposable carbide cutting tools. Engineers at Convair, San Diego, have reported that they're getting higher surface speeds with the throwaways. Production engineers at GE's Erie, Pa., plant substantiate the fact, but they interpret gains in terms of tool life at standard speeds. Life per cutting edge has been doubled in some cases. Biggest single reason for the results: Thermal cracks or strains from brazing are completely eliminated.

STRONGER AXLES— GMC's new front axles for its trucks are 6 in. tubes which its engineers say resist torque 16 times better than the old I-beam style. They also hold 1000 cu in. of compressed air for the bellows which replace conventional leaf springs. Pressure is 65 to 100 lb. Built-in leveling valves balance air pressure and load.

IMPROVED COBALT ALLOY— High-temperature properties of a wrought cobalt-base alloy have been improved by additions of aluminum, boron and titanium, says a report issued by the Office of Technical Services, U.S. Department of Commerce. The basic alloy shows outstanding rupture strengths at 1500 to 1800°F. Aluminum improves oxidation resistance and lowers rupture strength. Boron increases rupture strength and ductility. Titanium increases room temperature hardness through an aging reaction.

DUMMY CUTTERS— Wooden milling cutters won't cut stainless steel, but they pay off in design and development. When Goddard & Goddard Co., Detroit, got the job to build special cutters for milling stainless turbine blades, engineers built wooden models to determine best blade arrangement, the most economical way to manufacture and the easiest design to maintain and sharpen. Cutters have chip breakers and staggered teeth to ease the machine load. All design problems were worked out on the wooden models.

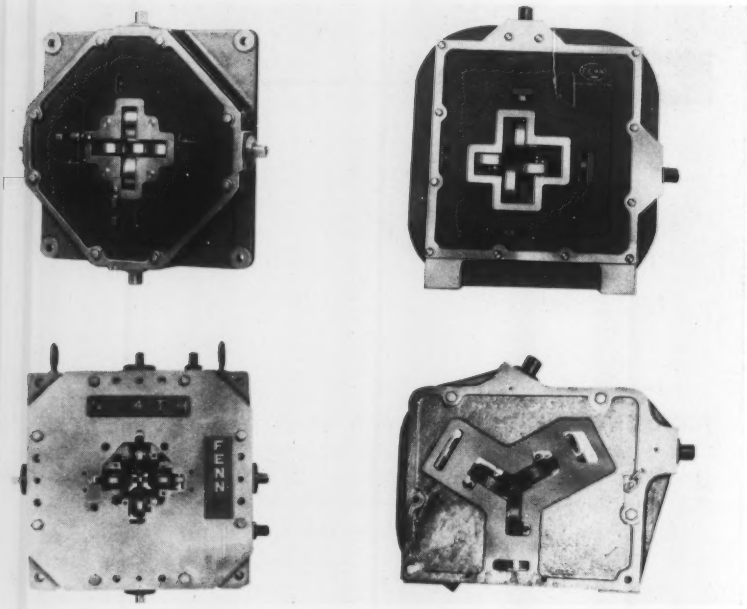
ATOMIC HEATERS— Nuclear reactors someday will be used for home heating, says Dr. A. Louis Medin, head of nuclear chemical technology for Alco Products Inc., Schenectady, N. Y. Most likely to develop for space heating use, believes Dr. Medin, is a pressurized-water system using a separate high-temperature water loop. The main distribution water would extract from primary, or radioactive water, through heat exchangers.

WELDING PROGRESS— Aluminum can be welded successfully to magnesium, says Lloyd A. Cook, Ravens-Metal Products Inc., Parkersburg, W. Va. His warm welding process (STEEL, Feb. 25, p. 108) uses relatively little heat and high pressures to produce joints which are said to be stronger than the magnesium alloy.

LIGHTER BOLTS— Martin's new Seamaster jets (P6M) will use 140 lb of titanium bolts, says Standard Pressed Steel Co., Jenkintown, Pa. Although small percentagewise, they save 105 lb in the finished plane. The fasteners are being limited to areas where temperatures do not exceed 200°F.

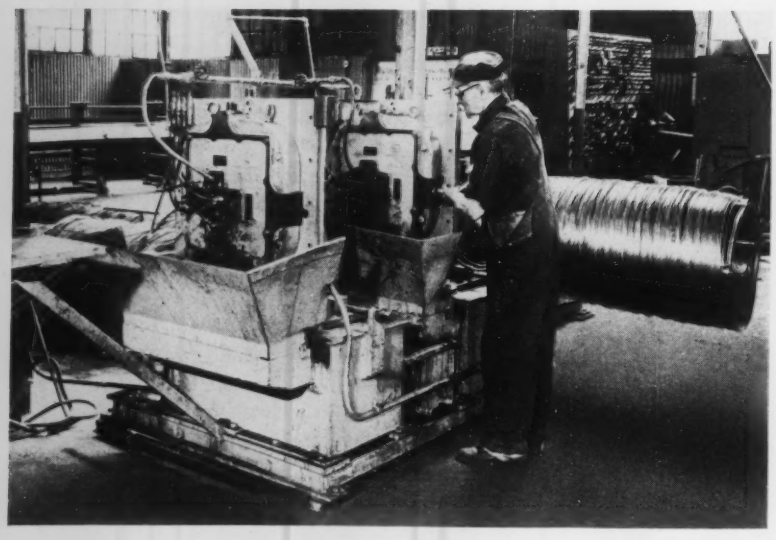
Metalworking Outlook—p. 47 *Market Outlook—p. 153*

These machines compare to adjustable draw dies, operate like small rolling mills. They can produce cross sections that become finished parts when sliced to length



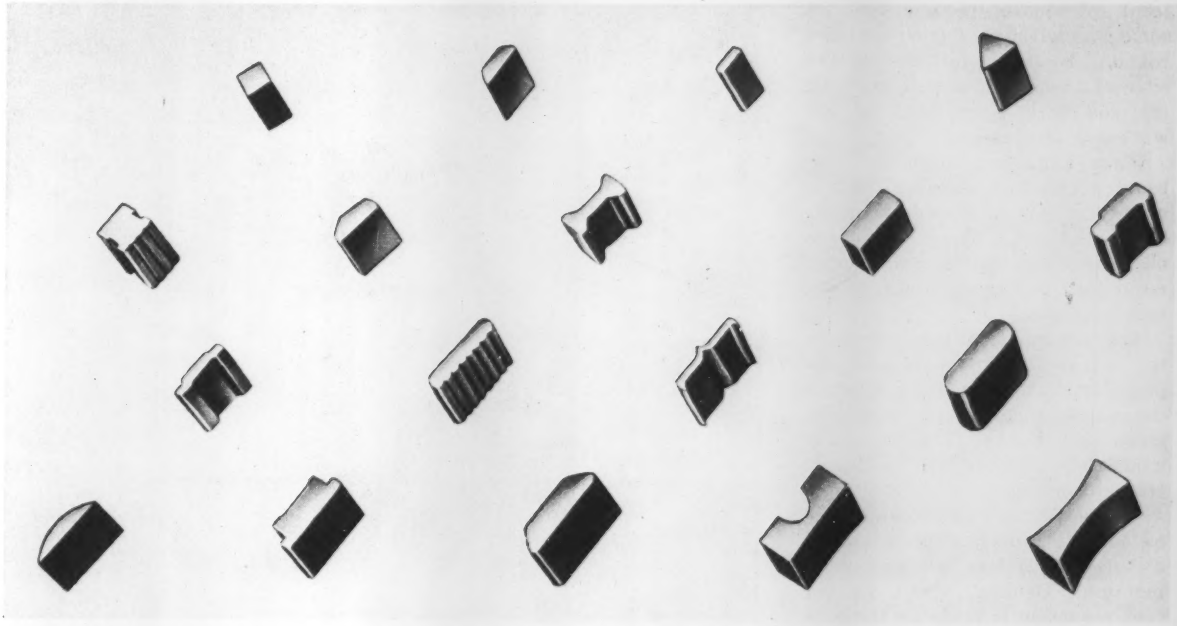
Four types of turk's-heads: Top—plain, universal; bottom—combination, triangular. Rolls of plain and combination types may be ground to special shapes

Turk's-Heads Shape Production Parts



Wire-shaping mill at National Lock Washer Co. uses tandem turk's-heads. First machine takes 75 per cent of total reduction on the keystone shaped wire

Universal type unit used at National. The machine has a stock entry guide and stock lubricating system



Samples of typical cross sections that can be rolled on the various sizes of turk's-heads. Often, slicing a section to length produces a usable, finished part

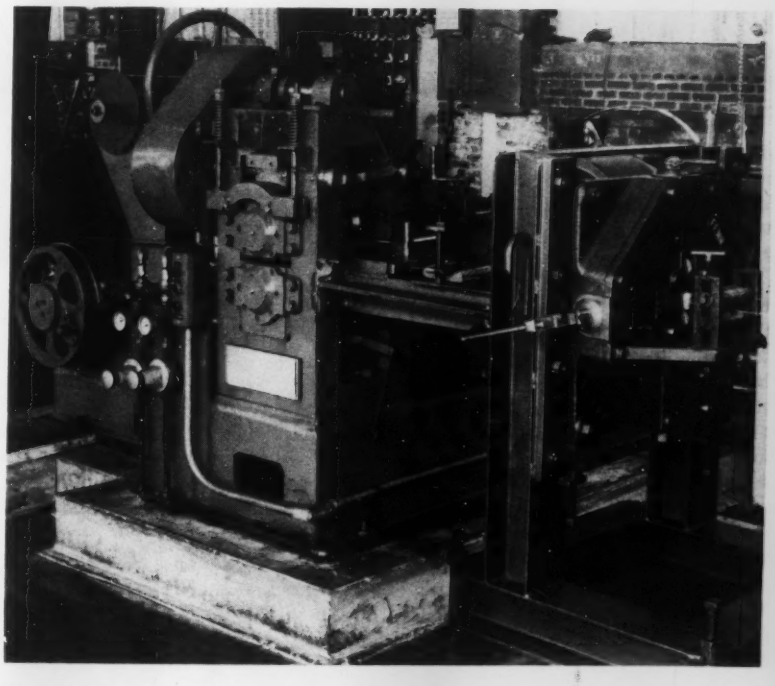
PICTURED above (left) are four models of a versatile little machine that turns out a nearly-finished product. Next to them are some of the shapes that can be rolled in wire and strip.

Originally, the turk's-head was used to shape precious metals for jewelry. Today, increased bearing capacities have extended its range. It will roll ferrous metals, including high alloy and tool steels, and nonferrous, including the tough titanium alloys.

How It Works — A turk's-head may be compared to a draw die that is infinitely adjustable within its limiting dimensions. It operates like a rolling mill and imparts the same qualities to metal—good surface finish, accurate size and shape and improved grain structure.

The basic difference between it and a rolling mill is the number and arrangement of rolls. It uses a pair of vertically arranged rolls, as does the rolling mill, plus a horizontal pair. The names of the four types (universal, plain, combination and triangular) refer to the roll arrangement (see photo).

Types—Universal units are used



Simonds Saw & Steel Co. uses a turk's-head in tandem with a small cold roll sizing mill to put shaped edges on tool steel strip. Round, square and chamfered corner edges are the usual types produced. Tolerances of 0.005 in. are easily held. Uniformity of edge quality depends on the quality of the slit edge of the beginning strip, the amount of reduction in the rolling mill following the turk's-head and the type of material (hard or soft) being rolled

to draw square, rectangular and some special shapes from suitable rounds. Work is formed on the edge of the roll face with more of the roll face being used as the work size increases.

Plain units are used to draw basic rectangular shapes and a variety of special shapes by means of ground rolls. Work is formed on the roll face center, and heavier reductions are possible than on the universal type.

The combination unit combines the features of the universal and plain types and may be used to draw basic rectangular shapes and many special ones. The triangular model is used to draw equilateral triangular shapes.

Installations—The machines can be used in tandem, with a motor-driven, take-up reel, as a wire-shaping mill. Usually, about 75 per cent reduction is made on the pass through the first unit. The remainder is done on the second machine.

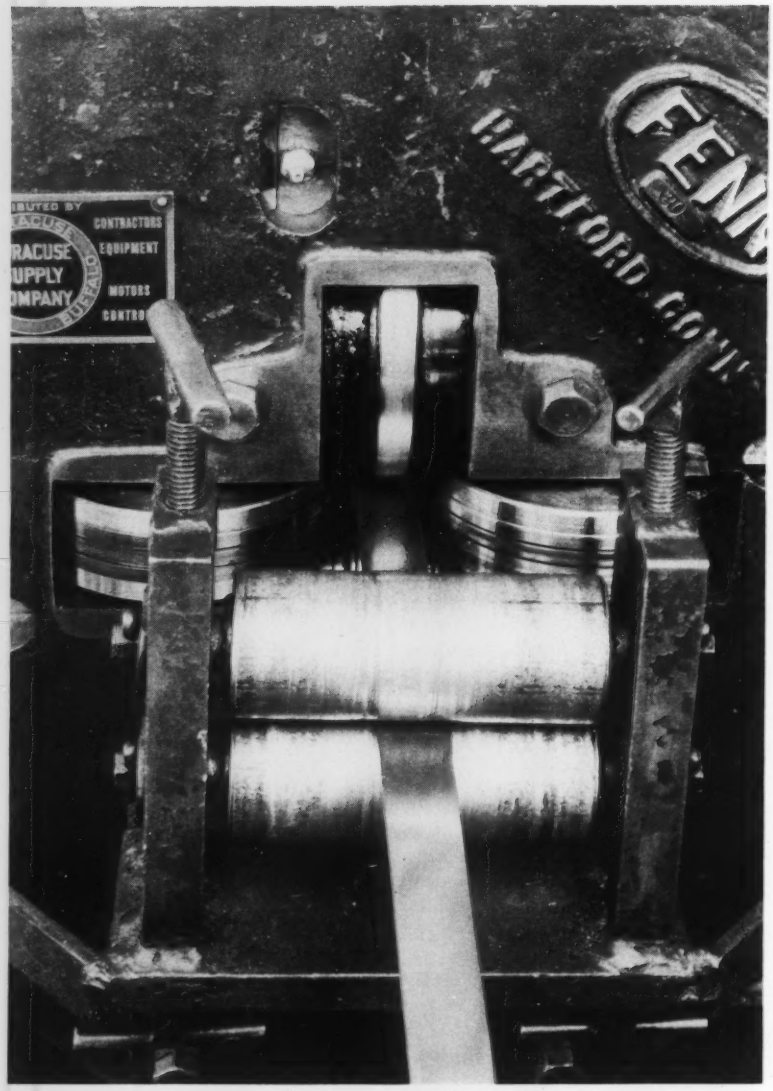
Mounted in tandem with rolling mills, a turk's-head may be used solely as an edger, or it can be used to shape the strip. Since wire flattening in a rolling mill results in variations in stock widths, the unit may control stock width as an edger and simultaneously take a sizable vertical reduction.

Combining the machine with a draw bench is useful for short runs where coiling is impractical. A typical unit shapes 2½-in., hot-rolled tubing to a round cornered, 2 in. square cross section.

Lock Washers—The Shaped-Wire Division of National Lock Washer Co., Newark, N.J., turns out 10,000 to 15,000 lb of shaped wire in 8 hours. It supplies shaped wire for the Newark and Milwaukee plants of National. Only three operators are required to maintain peak production.

The division's facilities include a wire-shaping mill—a turk's-head-rolling mill combination—and a variety of universal and plain type turk's-heads in various sizes. Fenn Mfg. Co., Newington, Conn., built the machines.

Operation—The wire shaping mill is used to produce a keystone-shaped cross section in a two-step reduction. Hardness builds up in the wire during shaping, so it does not buckle when a mechanical gripper pushes it through a lock washer machine.



Close-up of the turk's-head used at Simonds showing three of the four rolls in contact with the strip. The two rollers in front are guides

The wire used by National varies from 0.025 to 0.460 in. in diameter and is chiefly SAE 1060 and 1010 steel.

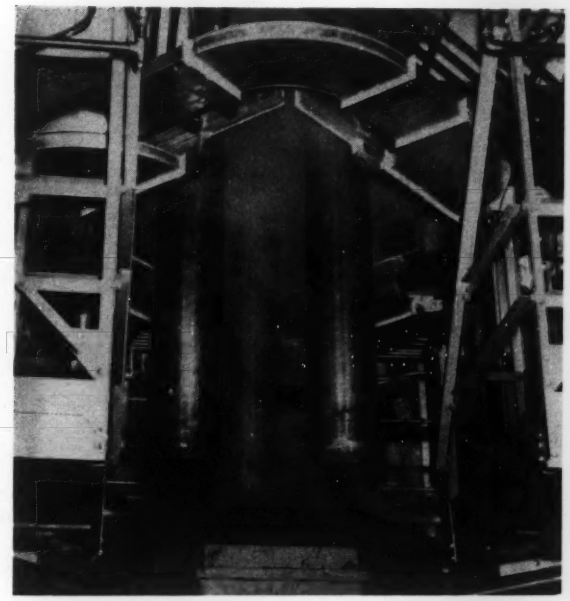
Edging—Simonds Saw & Steel Co., Lockport, N.Y., uses turk's-heads made by Fenn Mfg. Co. to roll shaped edges on tool steel strip. The machine is used in combination with a cold roll sizing mill to produce strip ½ x 0.020 to 1½ x 0.062 in.

Round, square and chamfered corner edges are the usual types. Tolerances of 0.005 in. on the widths are easily obtainable.

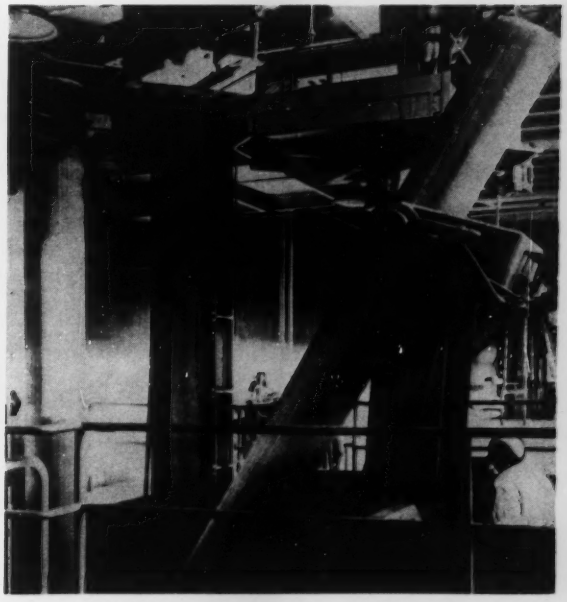
Slice To Fit—Often a turk's-head can produce a strip with a cross section from which usable, finished parts may be sliced. Examples: Bushings for silent chain drives, Y-shaped zippers, voltage regulator terminals, motor spacers and fasteners.

Sometimes a forming operation is required. Examples: Piston ring stock, hacksaw frames and decorative trim for appliances.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



Three billets 18-in. in diameter are cast simultaneously. Mold stool supporting platform can be seen below billet. Its hydraulic cylinder has almost a 30-ft stroke



A 20 in. billet, 25 ft long, is removed from the machine. The billet grab arm picks up one billet, tilts while the carriage moves back and lays it down on a conveyor

Giant Extrusion Billets Cast Continuously

TWO vertical, direct-chill casting machines turn out aluminum billets for the recently completed U.S. Air Force Heavy Press Extrusion Works at Halethorpe, Md. It's operated by Kaiser Aluminum & Chemical Corp.

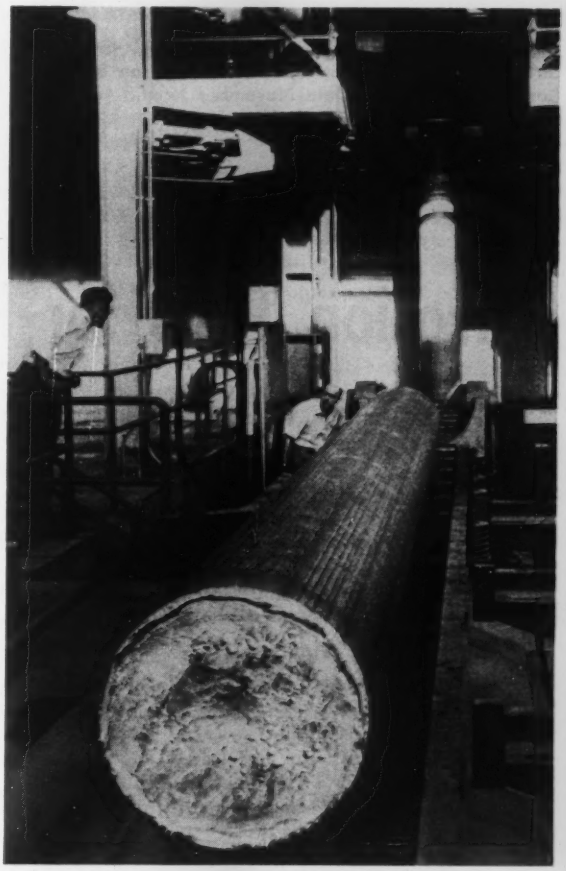
Kaiser has continuously cast highly alloyed billets with good metallurgical structures that are free from inverse segregation. Typical alloys are 6061, 6062, 2024 and 7075.

Hot Metal—Four gas-fired reverberatory furnaces, with a capacity of 50,000 lb each, supply the hot metal. It flows from the holding hearths through a refractory-lined, electrically heated swinging trough into a distributing pan and finally spouts into the water-cooled aluminum molds.

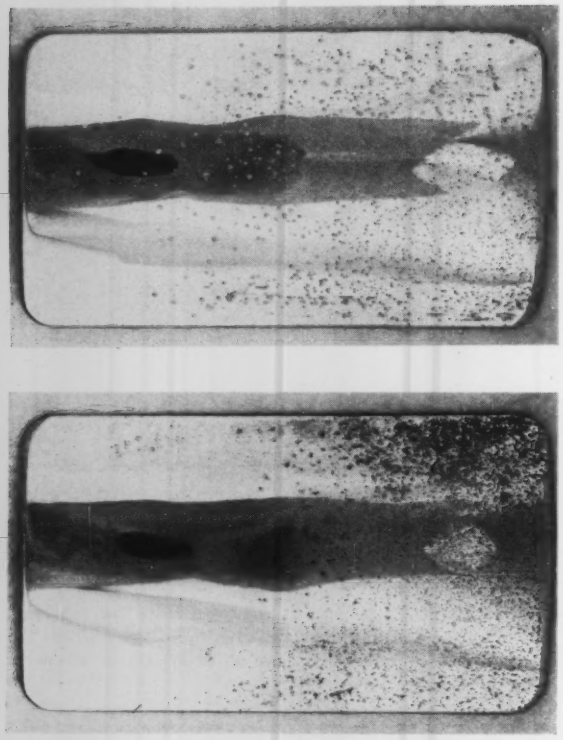
The machine can cast billets up to 25 ft long and 20 in. in diameter. Depending on the diameter being cast, each unit can produce two or more billets simultaneously.

Speed—Billet lowering speed is variable, up to 8 ipm. Lifting speed is fixed at 90 ipm. The hydraulic mold stool platform can support a billet load of about 20,000 lb.

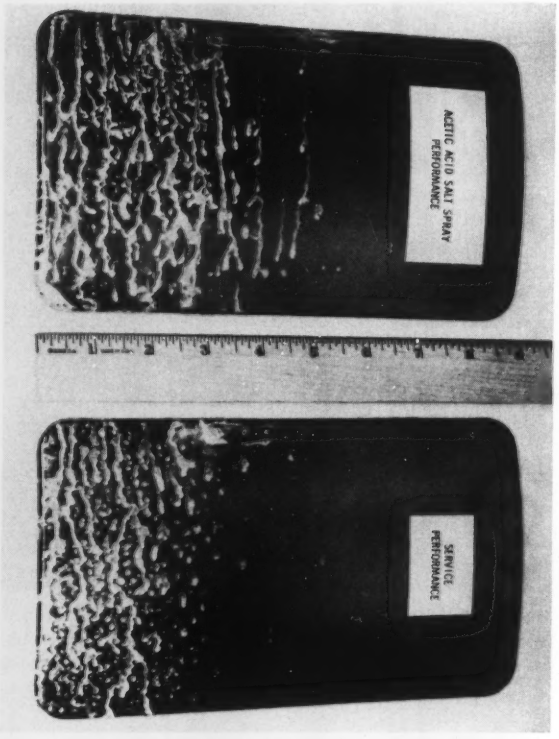
Loma Machine Mfg. Co. Inc., New York, built Kaiser's casting machines. The firm also is building a six-station casting installation for the new Kaiser plant at Ravenswood, W. Va., which will cast rolling mill slabs weighing 20,000 lb each.



A billet is weighed on the 5-ton scale built into the discharge conveyor. In the background is an unloaded billet



Zinc die-cast panels plated with copper, nickel and chromium. The panel at top was exposed on a Chrysler Corp. mail truck from late November to mid-April. The other panel was Corrodkote tested



Zinc die-cast panels plated with copper, nickel and chromium. One was exposed to corrosive atmospheres in service; the other went through the acetic acid salt spray test

Corrosion Tests for Plated Parts

Use of a new method, called Corrodkote, duplicates the type and extent of corrosion that attacks decorative plated parts on car exteriors in Detroit

TWO successful procedures have emerged from a research effort by the American Electroplaters' Society to create a dependable accelerated corrosion test for decorative plated coatings: The acetic acid modification of the salt spray test and the Corrodkote test.

Dr. R. B. Saltonstall, technical director of Udylite Corp., Detroit, described them at the summer meeting of the Society of Automotive Engineers.

Another area explored by SAE members: Accelerated tests for anodic films. R. S. Dalrymple, chief corrosion engineer, Engineering Services Department, Reynolds Metals Co., Louisville, discussed their current status.

Latest—The newest test, Corrodkote, is getting a lot of attention from auto companies. It's a controlled adaptation of conditions exterior plated parts are exposed to in service.

The plated surface is made wettable and kept that way in a corrosive environment. (That is what happens when your automobile becomes coated with road slush. It's exposed to salt from the road and corrosive industrial atmospheres, then stored in a garage where humidity is high.)

Duplicated—In the test, plated surfaces are made wettable by rubbing them with an abrasive compound which is mixed with water and other chemicals to form

Corrodkote Formula

Cupric nitrate	0.035 gram
Ferric chloride	0.165 gram
Ammonium chloride	1.0 gram
Kaolin	30.0 grams
Water	50.0 milliliters

Acetic Acid Salt Spray Solution

Sodium chloride	5 or 20%
Acetic acid	enough to maintain pH of salt solution at 3.2 to 3.5*
Water	balance

*In good water, 1% of 36% acetic acid solution or 0.5% of glacial acetic acid will be sufficient.

Removing panels from acetic acid salt spray test equipment

a paste. The sample is subjected to high humidity to create accelerated attack on the plate.

The abrasive is kaolin, a pure clay which has no chemical effect on the plating. Chemicals duplicate the materials found in road slush and the atmosphere.

Other One—This is a modification of the salt spray test which has been used for a number of years. The big difference is that the solution which is atomized and sprayed onto the parts contains acetic acid in addition to 5 or 20 per cent salt (by weight) in water.

The acetic acid addition makes for a pretty faithful reproduction of the types of corrosion which damage copper, nickel and chromium plated parts. The neutral salt spray test in many instances failed to do this, stated Dr. Saltonstall.

Technical Proceedings of the AES (1953, 1955, 1956) report on the equipment, method of conducting the test, restrictions of its conditions, statistical methods of sampling and statistical analysis of results.

Yardstick—It is still necessary to calibrate these tests in terms of product quality which the buyer of plated parts is seeking and that quality which industry is capable of producing, Dr. Saltonstall said.

Either or both tests may be the measuring stick which has been unavailable, he stated. Now, it is possible for the plating industry to carry out research aimed at economic progress and high quality.

Anodic Films—Accelerated corrosion tests for anodic films are generally useful only as characterization devices, explained Mr. Dalrymple. They are not tools to predict the ultimate life of materials or coatings in environmental exposure.

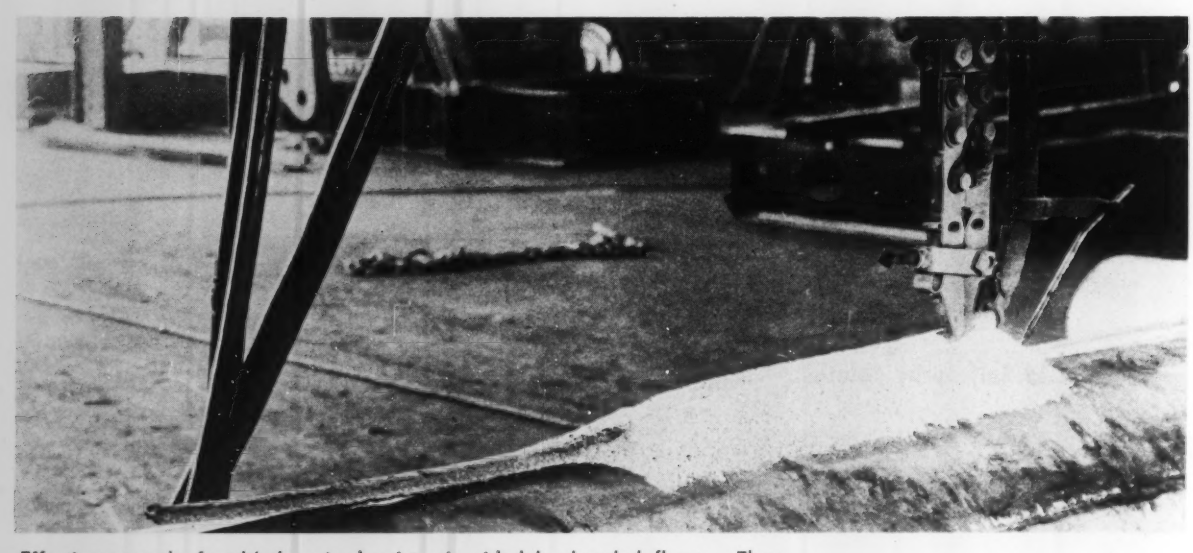
"Carefully chosen accelerated tests can guide the research and development engineer in the choice of proper alloy and proper coating technique and will generally indicate which combination of variables will lead to longer service life," he added.

Service experience proves that early failure in the modified salt spray test means the anodic film will not provide good protection with or without additional organic coatings. If salt spray tests are continued until breakdown, you can generalize on the relative behavior of different types of anodic films or film thicknesses for service under marine conditions.

Other tests include the fadometer (exposing dyed panels to light from a carbon arc) and the weatherometer (fading under carbon arc, water spray, heating and cooling, usually on a cyclic program). They produce information which, combined with environmental data, can be valuable in the development of new coatings, dyes or pigments and coating techniques.

Thickness—Experience in America and Europe shows that anodic films 0.0002 in. thick begin to pit in one to two years in corrosive environments. Sealed films 0.0008 to 0.001 in. thick will remain free of attack 15 to 20 years, provided the anodized aluminum receives regular maintenance.

For comparison, in the acidified 5 per cent salt spray test, sealed 0.001 in. films stand up about 100 hours. Films 0.0002 in. thick last about 40 hours, Mr. Dalrymple said.



Effective control of weld deposit chemistry is aided by bonded fluxes. They incorporate minerals which make slag self-removing

New Fluxes Simplify Welding

Chemistry of weld puddle can be controlled more accurately. Low melting temperature of flux keeps additives active. Important applications seen in stainless overlay welding

AUTOMATIC, submerged arc welding took another step forward with the introduction of a more flexible type of flux called Arcosite.

Developed by the Arcos Corp., Philadelphia, the material was described at the recent welding show in that city. H. C. Campbell, director of research, and Wallace C. Johnson, welding consultant, said these properties aid welders:

1. Flux composition and behavior can be adjusted.
2. Maturing temperatures are low—alloy additives don't oxidize as they are bonded.
3. Bright ceramic colors identify composition, preventing the use of the wrong flux.

Solution — Conventional fluxes work well on low carbon steel, but have limitations with stainless. They don't compensate for the loss of chromium and other elements. Fused slag sticks so tightly to the weld metal that operators frequently spend a lot of time removing it.

Another disadvantage of conventional fluxes, in the opinion of Messrs. Campbell and Johnson: Manufacturing temperatures are too high. Effective deoxidizers can't be used.

Because Arcosite matures at comparatively low temperatures, ferroalloys in the flux remain effective, adjusting the composition of a weld puddle to compensate for elements lacking in the filler wire.

Overlay — Chromium loss is solved by adjusting the basicity or by adding chromium or ferrochromium. With such control, you can use a mild steel wire to deposit a 20 per cent chromium-iron cladding on mild steel plate. All the chromium in the clad is supplied by the flux.

Bonded fluxes are being used increasingly for overlay welding. The first pass is made with a series arc technique. An alternating current arc passes between two wires and deposits the overlay metal on the base. It holds base metal dilution to 10 per cent.

An unusual example: The overlay on the heads and tube sheet of the Shippingport (Pa.) nuclear power reactor shell (STEEL, Oct. 15, 1956, p. 135). Walls were made of stainless clad, manganese-molybdenum steel 9 in. thick.

An exceptionally sound overlay was required for the tube sheet. Subsequent machining and tube welding would have shown up even slight defects. Test weld sections examined under a microscope proved to be clear and sound.

Blade Ring—A similar example is the stainless overlay on a 3⅛-in. thick casting for a central station blade ring. The part must withstand 500°F steam.

Ordinarily, you must use Type 309, paired 308 and 309, or paired 308 and 312 filler wires. The new flux simplified the job, and the entire area was welded with a Type 308 stainless filler wire.

Overlay welding is especially useful on cone-shaped or dished parts. Economy depends on thickness of the plate, the stainless layer, and the availability of clad plate. Savings are more apparent on complex weldments or those made from exceptionally heavy plates.

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..."the best tank lining we've ever had"

SAYS THIS LARGE ACID-CARRYING FLEET OWNER

One of the largest fleets of acid-carrying trucks in the East is P. B. Mutrie Motor Trans., Inc., owner of about 50 acid tankers. The truck above is one of their newest, and is the largest *rubber-lined* tank truck in New England, and one of the largest in the country. Like the other dozens of Mutrie's tanks, this one is lined with PERMOBOND,® the rubber lining that is resistant to corrosion, and that prevents iron rust from contaminating the chemical in the tank. This truck also carries a U. S. Rubber Acid Discharge Hose, engineered to fit particular corrosion conditions.

Any container of corrosive acids, no matter how complex its shape, can be lined with PERMOBOND—whether it is original equipment or existing equipment—whether it's over-the-road tank trucks or railroad tank cars.

So, for any rubber lining requirement, contact tank lining experts at U. S. Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, N. Y.

In Canada, Dominion Rubber Co. Ltd.

Mechanical Goods Division

United States Rubber

Success of Sendzimir process in the continuous galvanizing of mild steel strip depends on precise control. Here's how it's done at Armco's Ashland, Ky., plant

Radiamatic detector mounting over oxidized strip

Instrumentation for Galvanizing Control

CONTINUOUS galvanizing, as practiced at the Ashland, Ky., plant of Armco Steel Corp., requires the strip to be heated and cooled in rigidly maintained atmospheres before it is immersed in the zinc alloy bath.

Instrumentation is vital in maintaining precision balance and control of the process. Walter E. Hand, supervising metallurgist, Ashland Works, described the Minneapolis-Honeywell system at a recent conference on instrumentation for the iron and steel industry.

Oxidizing—A recording pressure controller regulates the burners on the oxidizing furnace. The operator selects a burner pattern consistent with the width of the strip by opening or closing valves to individual burners or groups. He then selects a burner pressure within the allowed range and sets the control index on the pressure controller to that value. Need for further adjustment is indicated by the record of the temperature of the strip as it leaves the furnace.

The record is made on a round chart, Brown Electronik pyrometer operating from a Radiamatic temperature detecting unit. The unit is mounted between the oxidizing and reducing furnaces in exposure to the top of the strip. A Brown Electronik indicator, wired in parallel with the temperature recorder, keeps the line operator informed on the temperature of the strip.

Pressure—The pressure controller operates pneumatically, with throttling and reset response. Valves are actuated in both gas and air lines ahead of the point at

(*Please turn to page* 116)

Stages in Armco-Sendzimir Galvanizing Process

Surface preparation of the base metal is the first stage. This is done in two steps: Oxidation of the strip surface, and reduction of the oxide. For economy, both are combined with other essential operations.

Oxidizing is done in a short furnace equipped with an adjustable pattern of high temperature, direct firing burners. The operation also cleans the surface of remnants of rolling lubricants and other combustible material.

The next stage, oxide reduction, also anneals the strip. It is done in a furnace heated by radiant tube burners fired with natural gas. The furnace must be practically gastight to contain the reducing atmosphere, which is dissociated ammonia. The atmosphere is maintained throughout the controlled cooling section of the furnace, although at lower temperatures the atmosphere becomes nonoxidizing rather than actively reducing.

The end of the cooling chamber, turning downward, extends into the molten metal of the coating pot, so the reduced strip surface continues under protection until immersed in the coating bath.

Emerging from the coating bath, the strip is conducted through a cooling tower, leveling equipment and a chemical surface treating station. Terminal equipment consists of shear, inspector's station and reject and prime pilers, or the strip may be coiled on mandrels. Loop cars provide sufficient storage of strip to accommodate moderate delays in operation.

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Mesta 46" Reversing Slabbing-Blooming Mill, Tables and Manipulators

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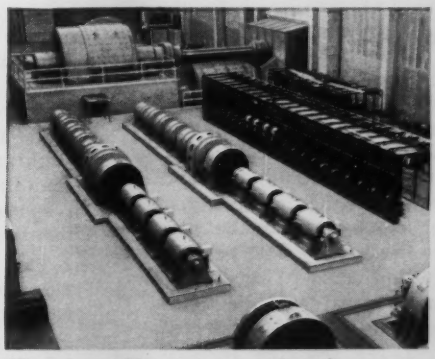
The blooming mill

Maximum electrical efficiency is assured in blooming mill operations where Allis-Chalmers equipment is used. From switchgear to drive motors, Allis-Chalmers offers a tailored system — engineered by mill experts and designed to keep high quality blooms rolling fast and accurately.

From mine to final processing—Allis-Chalmers equipment is in step with the increasing tempo of expanding steel production. Contact the nearest A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.



Blooming mill motor room view shows components of the Allis-Chalmers electrical package. Switchgear, control, constant and variable voltage motor-generator sets, *Regulex* motor-generator sets, liquid rheostat, and twin drive motors are designed to work together for peak mill output.

Regulex and *Texrope* are Allis-Chalmers trademarks.

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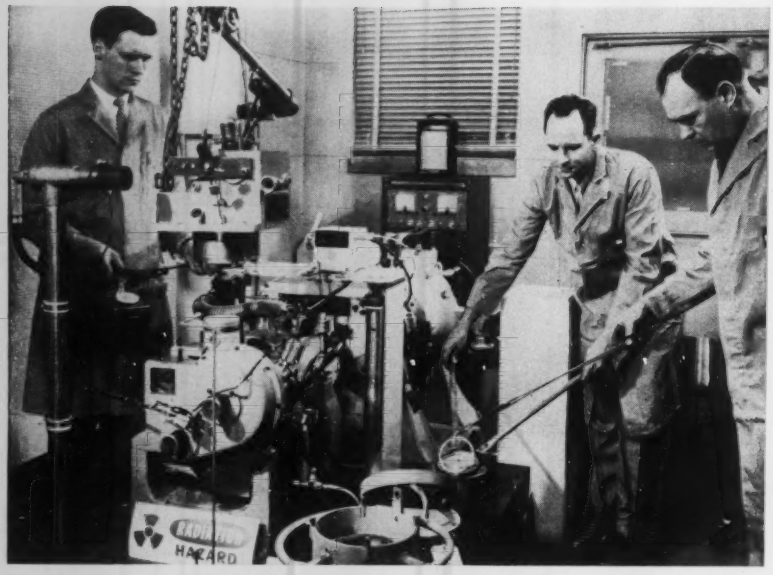


Radioactive Piston Ring Tests Lube Antiwear Properties

Technicians at the Automotive Products Laboratory of the Gulf Oil Research Center, Harmarville, Pa., remove a radioactive piston ring from an engine. They're testing antiwear properties of lubricating oils. The radioactivity of the oil is a measure of the metal worn from the piston ring. This is one of several research projects at Gulf's new laboratory which was dedicated May 29

GALVANIZING CONTROL . . .

which the two are mixed. Control is based on fuel pressure rather than directly on temperature because of the limited turn-down permitted by premixing fuel and air.

Some thought has been given to a scheme by which the pressure controller index would be automatically adjusted (within limits) from temperature indications.

Reducing — For purposes of control, the reducing furnace has been divided into four zones. The temperature of each zone is detected by a Radiamatic unit, sighting into a closed-end tube which is mounted in the roof of the furnace. The closed end of each tube extends to within a few inches of the strip pass line, so the influence of the strip temperature on the indicated zone temperature is considerable.

A round chart, recorder-controller, with both throttling and reset responses, serves each zone. Control is primarily through regulation of combustion air flow to each zone through a pneumatically operated North American valve. Gas is regulated with separate regulators proportioning gas to air.

Limits — A complete auxiliary system is provided for supervisory, (or limit) control on each zone. A second Radiamatic detector is mounted in the roof of each zone, with the end of its sighting tube slightly farther from the strip than its companion, making it more responsive to furnace than to strip temperature.

The recorder-controller is provided with high temperature limit contacts. They are connected to electropneumatic relays which cut off the supply air and bleed the line to the control valve positioner if temperature exceeds set limits. A series gas valve, normally held open by pressure from this same supply air, shuts off in the same event, or in the case of electrical panel supply failure.

Cooling—For purposes of control, the cooling sections of the furnace are divided into three zones. Heat exchanger tubes, cooled by fan-propelled air, do the cooling. The amount of air furnished each zone is governed by the relationship of the temperature of the zone to the corresponding set point. This is done through pneumatic operation of a valve in the cooling air supply.

If heat is needed in the cooling zones, it is provided by electric heaters. They cut in on demand as evidenced by the pressure in the control circuit which governs the cooling means. A Pressuretrol type of pneumatic-electric relay operates when the pressure in this circuit indicates that the cooling air is off completely.

Cooling zone temperatures, a composite effect of strip and furnace temperatures, are detected by thermocouples mounted through the roof of the furnace at its center line. Round chart, recording-controlling pyrometers actuate the controls.

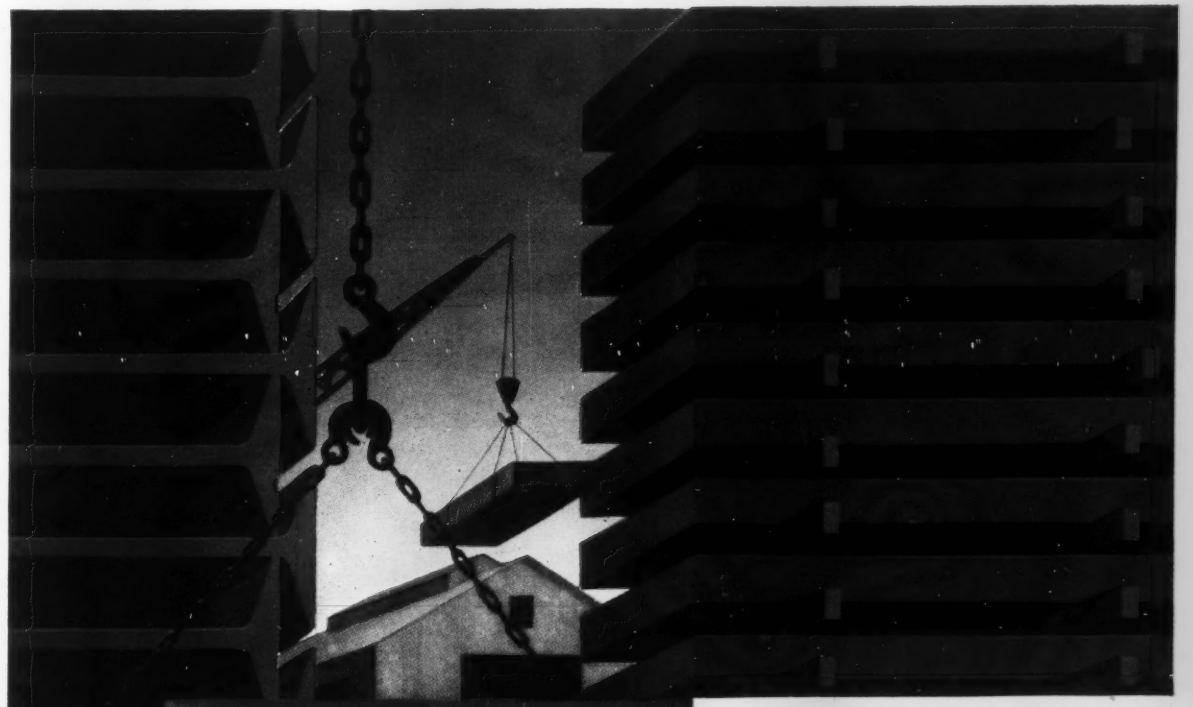
Zinc—A thermocouple, immersed in the melt, determines pot temperatures. Heat is introduced by the entering strip, which is essentially constant. Little additional heat is needed. Temperature is recorded on a round chart, recording pyrometer.

The temperature of the pit furnace surrounding the pot, which is used mainly for warm-ups and extended delays, is detected by a thermocouple and recorded and controlled by a round chart, recording-controlling pyrometer.

Panels—The main panel carries a selector switch and auxiliary recorder-controller. With this instrument and an installation of protection tubes and thermocouples paralleling each of the Radiamatic installations, any temperature in the system may be checked. Since this is a controlling instrument, it may also be used to furnish emergency or temporary control at any point by making relatively simple changes in the pneumatic control circuits.

Speed of the strip is recorded by an Esterline-Angus tachometer of conventional design and application. Electric heating units of the ammonia dissociators are controlled by indicating-controlling pyrometers operating from thermocouples in the units. Auxiliary instrumentation appears on the operating consoles in the form of simple indicating tachometers, loop-car position indicators, various ammeters and voltmeters indicating motor and heater loads.

The control system succeeds only if the speed of the strip is maintained carefully within the range for which the unit was engineered.



New Facilities to do a better job for you

During the past six months Levinson has been undergoing a major expansion program designed to meet the increasing demands of its customers for plain and fabricated steel.

New warehousing facilities have been acquired in McKees Rocks, Pa. and the company is in the process of adding new, modern equipment for cutting and fabricating. All of this adds up to an even better job for Levinson customers.

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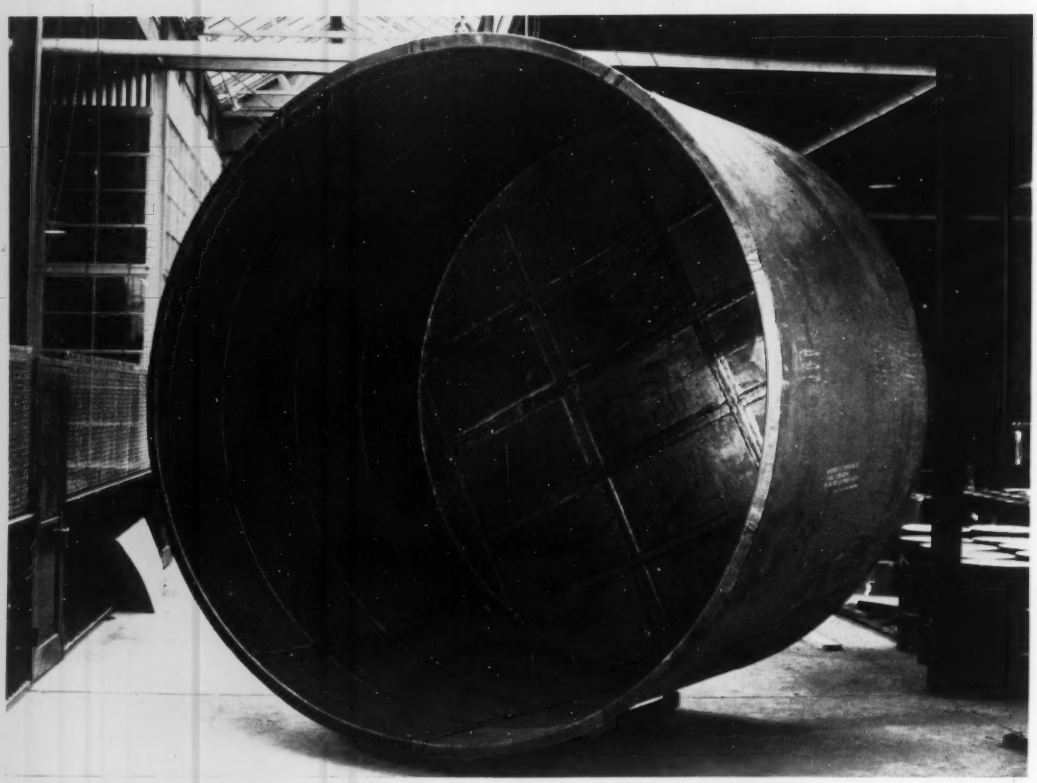

The CARBON STEEL TANK shown above was HERECROL lined in our shops and later installed in a Wisconsin Paper Mill for liquid alum storage. HERECROL Sheet Lining is available in ⅛" and 3/16" thickness. Applications may be accomplished in the field as well as in our shop.

The HERECROL Self-Curing Synthetic Rubber Sheet Lining can be applied to steel tanks and other equipment unlimited in size. No special equipment is required to provide heat or pressure. Storage tanks, processing vessels, tank cars, trailer tanks, pipes, fans, blowers and duct systems have been carefully processed.

The following solutions can be handled safely in HERECROL lined equipment:

HYDROCHLORIC ACID • FERRIC SULFATE • SODIUM HYDROXIDE • NITRIC ACID
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EASTERN DIVISION—GARWOOD, NEW JERSEY

New Look in Valve Making

Heat treated forgings pass through a series of grinders to emerge as finished automotive valves. The line is engineered for continuous operation with automatic size control

WITHOUT being touched by a cutting tool, rough forgings are processed into finished auto valves on an automated line at Thompson Products Inc., Cleveland. Grinding does the complete machining job. Here are the reasons for letting it do the work:

1. Heat treating can be done first. There's no need to interrupt the flow on the line. 2. Future alloys that might be too hard to cut will still be grindable. The possibility of obsoleting the line is reduced. 3. Grinding wheels can be run for several shifts without down time and can be dressed automatically—the line can run continuously for long periods.

Pace—It used to take seven days to run valves through the plant. Now it's done in only an hour. Rough forgings are poured into a hopper at the beginning of the line. They're lifted to a feed chute that carries them to an abrasive cutoff machine. Forgings too short for complete cutoff are kicked out.

The next stop is a centerless grinder where the stems are ground to size, with a tolerance of ±0.00035 in. Disc grinders do the rough and finish grinding on the tips and valve heads. A crush grinder grinds the grooves and the outside diameter of the valve heads. The machine has automatic crushing and automatic wheel compensation after crushing to allow for change in wheel size.

Control — Thompson-developed gages check valves after every grinding operation; they feed control information back to the machines to adjust for size.

Conveyors between the machines are long enough to let parts accumulate as a form of storage. Interlocking controls shut down any machine when the loading chute to the next machine is filled.

How's Business?

It's excellent, according to distributors for Lodge & Shipley Co., Cincinnati machine tool builder. Reflecting the optimism of other distributors (STEEL, Mar. 25, p. 121), ten L&S distributors report they are selling at a faster clip than they did last year.

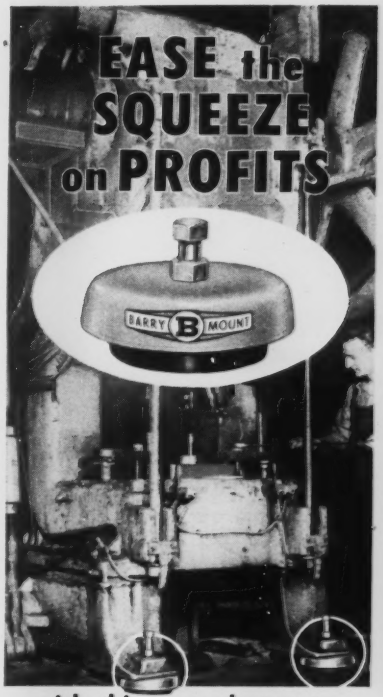
So far the distributors are averaging at 164.7 per cent of the 1956 pace.

Here are their advances, by city: Cleveland, 313 per cent; San Francisco, 237 per cent; Washington, 161 per cent; Rochester, N.Y., 160 per cent; Cincinnati, 141 per cent; Houston, 141 per cent; Norfolk, Va., 133 per cent; Indianapolis, 132 per cent; St. Louis, 114 per cent; Miami, Fla., 114 per cent.

Million-Dollar Lathe

In its annual financial report to employees, management at Thompson Products Inc., Cleveland, told workers about taxes, profits and the cost of doing business with a story about the "Million-Dollar Turret Lathe." It goes something like this:

In 1942 Thompson bought a $12,000 Warner & Swasey 3-A turret lathe. It became obsolete in 1956 and had a resale value of $1000. Thompson had $12,000 depreciation money to add to the $1000 for a new lathe, but a new machine with attachments to meet today's more exacting requirements would cost $67,000. Management was $54,000 short. It would take a profit of more than $112,000 before taxes to get the $54,000. To earn that, the company had to sell more than $1.25 million worth of products—all that to buy one badly needed machine tool.



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MORE OUTPUT
per machine

NOW YOU CAN HAVE new plant-layout flexibility that lets you put every machine right where it's needed to deliver full output on each job. Barry Mounts make even large machines "portable", level them, and eliminate need for anchoring to the floor. So it is easy to fit plant layout to production needs. And even *daily* plant-layout changes are fully practical.

PROVED SAVINGS

- Savings up to 20% in cost of production labor
- 90% saving in machine-installation cost
- Four-times faster set-up for special production

ARE HIGH COSTS SQUEEZING YOUR PRODUCTION — AND PROFITS?

Write for reprint of "The Iron Age" report on proved savings; also Barry Plant Survey Chart showing cure for eight production losses.

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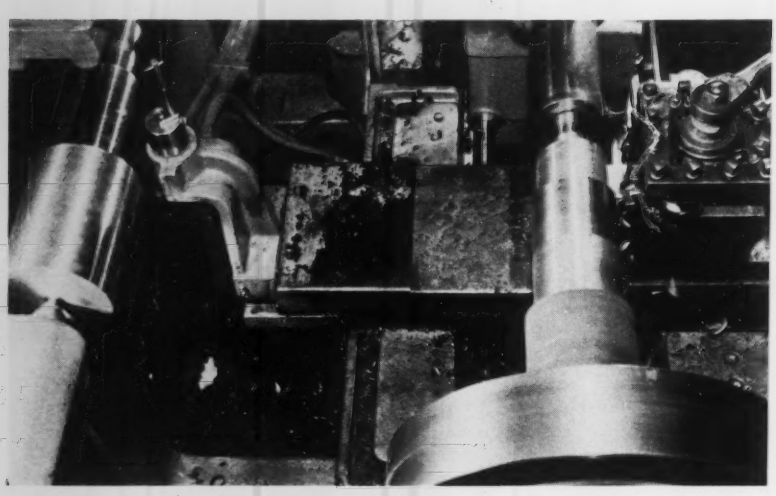

Template and tracer mechanism are mounted at the left. Carbide tool is taking a roughing cut of ¾-in.

Carbide Tool Saves Time

Combined with a tracer control, this firm increased its daily production fourfold. Part of the answer to greater production speed lies in finding the right carbide for the job

THE combination of tracer control and carbide tools removes 18 lb of SAE 1020 steel a minute.

That's the way Improved Machinery Inc., Nashua, N.H., saves 14 hours a day, not including setup time and tool savings.

Equipment — The firm makes paper and pulp processing equipment and plastic injection molding machines.

Some vaned rolls for pulp processing are 219 in. long. An important element is the head and journal, which is machined from a single billet. The journal portion is fitted with a stainless sleeve before it is assembled.

The part used to be machined on an engine lathe. Reducing the 7 in. diameter to 6¼ in. took about 6 hours. Daily production was two parts.

With the new setup, parts are machined in 1½-hours.

Less Time—The carbide tool (Carboloy 370) eliminates tool changes during the day. It holds size well—on an 8½-in. cut, lost taper is no more than 0.0005 in.

After the initial template is completed, the lathe reduces setup time and makes duplicate parts accurately. Machining the template takes about half an hour, including inspection time.

Billets are machined at 500 and 800 sfpm. The work load is about 50 hp.

No coolant is used because of the close tolerances required. When the part becomes hot, the operator removes it for cooling.

Speeds and Feeds — Roughing cuts average ⅝ to ¾-in. with a feed of 0.021 in. During finishing, the tool is fed at 0.016 in.

The carbide tool lasts about twice as long as other grades tried. It is a left-handed tool used on its side. It has a 1/32-in. nose radius, 7 degree side and end relief, 0 degree side cutting edge angle. The tool has a 6 degree positive side rake, no back rake. The chip breaker, which runs parallel with the tool, is about 0.125 in. wide and 0.018 in. deep.

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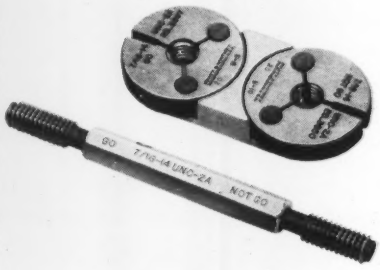
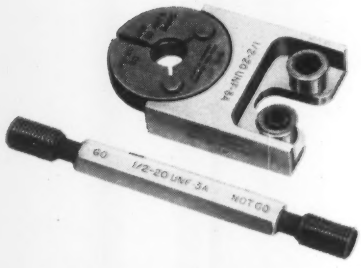
. . . AND FOR YOUR THREAD-INSPECTION JOBS BEST HANDLED BY P&W CONVENTIONAL GAGES . . .



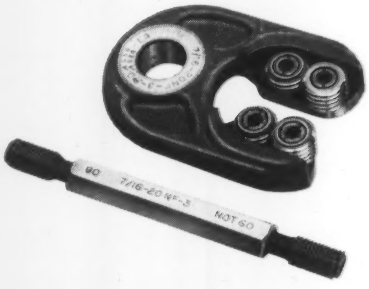
"GO" and "NOT GO" RING GAGES

provide a functional check at maximum metal limit and a pitch diameter check at minimum metal limit.



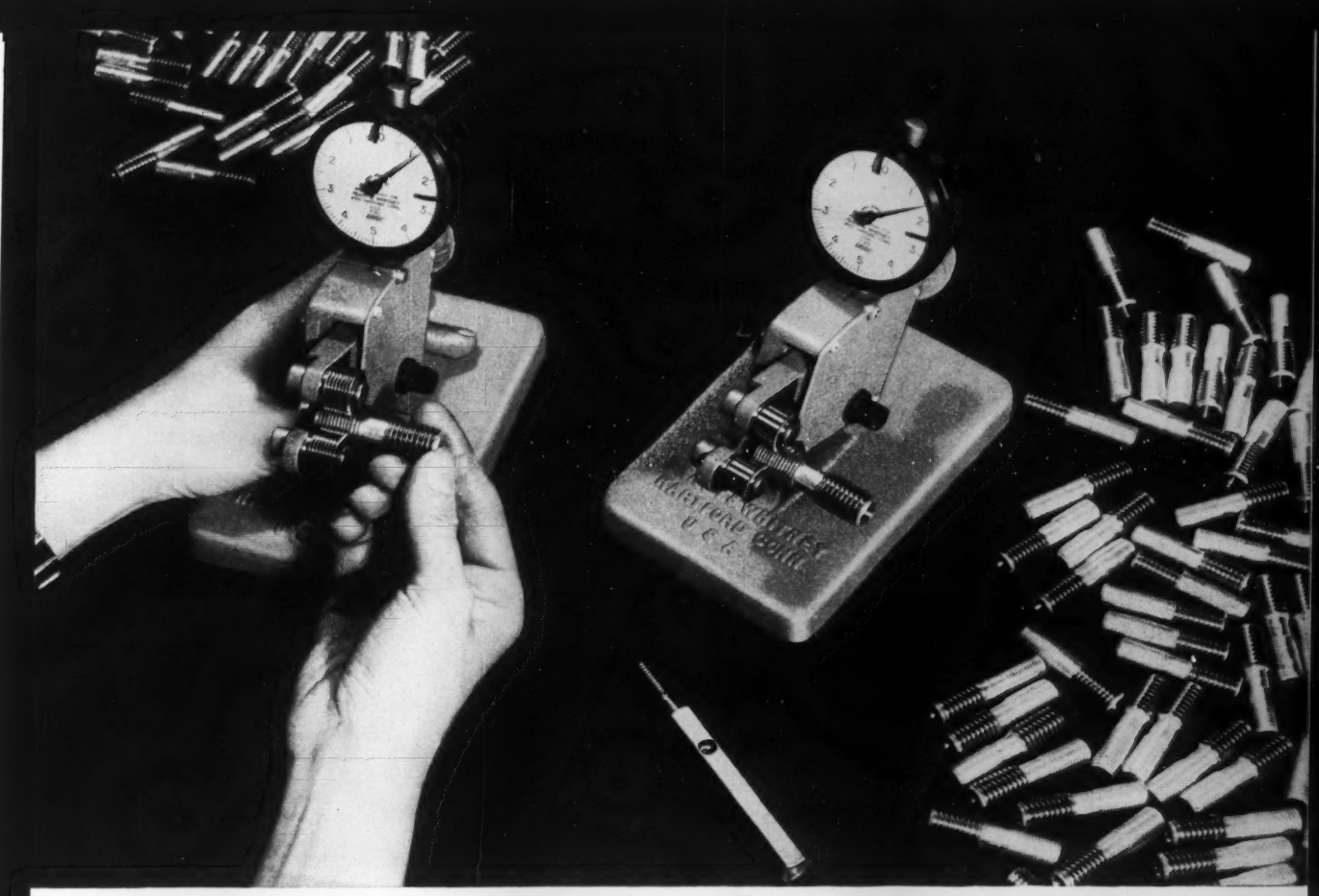
RING-SNAP LIMIT THREAD GAGES

provide a functional check with a "Go" ring at maximum metal limit and an actual pitch diameter check at minimum metal limit with single-rib radius rolls of best wire size.



ROLL THREAD SNAP GAGES

provide a functional check with multiple-rib "Go" rolls at maximum metal limit and a pitch diameter check at minimum metal limit with 2-rib "Not Go" rolls.



CHECK CLASS 3 and 3A THREADS *on a Production Basis*

. . . QUICKLY, DEPENDABLY AND ACCURATELY WITH A P&W TRI-ROLL THREAD COMPARATOR

Here for the first time is a *production gage* that duplicates the precise 3-wire thread measurement method. Equipped with single-rib rolls, the P&W Tri-Roll Thread Comparator provides this *critical check at actual pitch diameter* which is essential in producing threads to meet Class 3 and 3A standards. Equipped with interchangeable full-length rolls, it also provides a *complete functional check* . . . detecting "drunken lead" and deviations in lead, roundness, angle, and pitch diameter.

Today, a greater demand is placed on you for higher precision. A fast-growing percentage of threads must now be produced to meet Class 3 and 3A standards. Be sure your quality control methods are geared to keep pace with this growing demand . . . efficiently and profitably. Write now for complete information on P&W Tri-Roll Thread Comparators.

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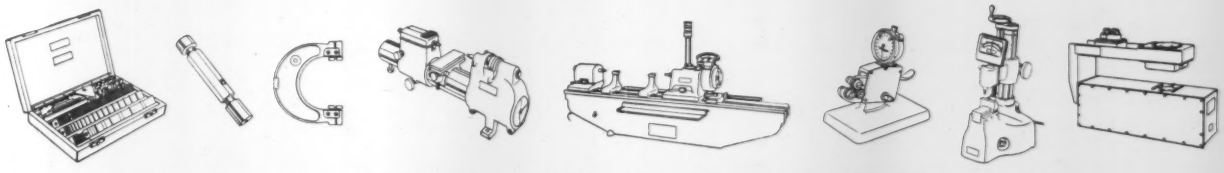

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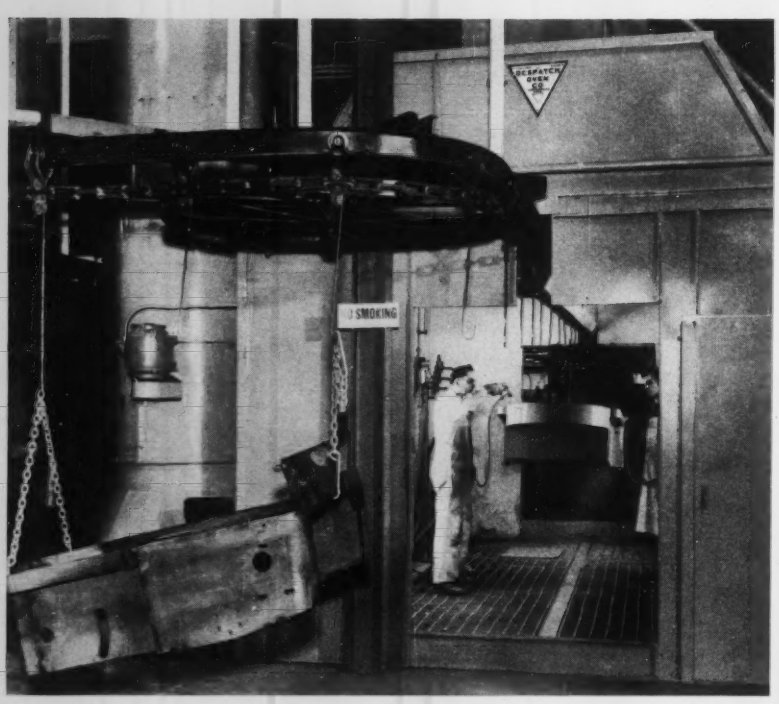

All parts enter 3-stage washer at right, then return through 34 ft dry-off oven at left. Master control panel is alongside dry-off oven

Finishing System Triples Output

Continuous conveyor setup includes three-stage washer, dry-off oven, two-man spray booth and a 74-ft baking oven. It will handle 100 to 150 loads at a time. Part sizes vary widely

A NEW finishing system at G. H. Tennant Co.'s new Minneapolis plant will do a job in 24 man-hours that formerly required 80.

The company used to have trouble painting production quantities of 1000 different parts for their power sweepers, floor machines, scarifiers, roof scrapers and concrete routers. The new system was engineered, built and installed by the Despatch Oven Co., Minneapolis. It speeds the washing and drying of parts weighing ounces to 800 lb and the spraying and baking of the prime coat and the bright orange or cream finish coat.

All metal parts first enter the 44-ft washer where an acid pressure spray converts the surface to an iron-phosphate coating. This is followed by a cold water rinse, then a hot rinse that hardens the rust and corrosion resistant phosphate salts.

Parts pass immediately into the 34-ft dry-off oven which is maintained at 350 to 400°F. They are then carried to the downdraft filter spray booth where the prime coat or either of the finish coats is applied.

The 500-ft conveyor moves about 8 ft a minute, giving sprayers sufficient time to finish any of the parts.

After the prime coat is sprayed and baked on, parts go through the system again (washer is temporarily shut off) for spraying and baking of the finish coat.

Just-sprayed parts travel up and into the oven through its underside opening. Baking takes two passes—8 minutes at 330°F.

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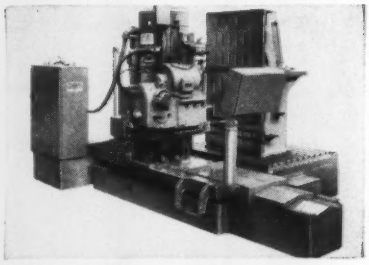

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KELLER Type BG-21

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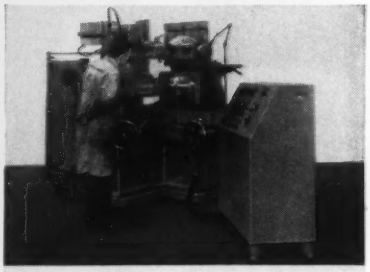
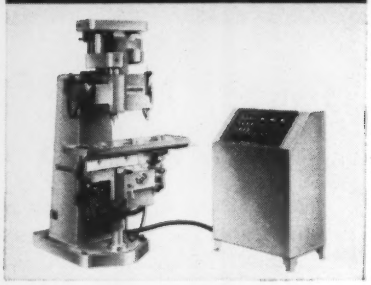
... A compact powerful Tracer-Controlled Miller for work within the range of 36″ x 20″, with all the new KELLER features. Single spindle and 3-spindle models.



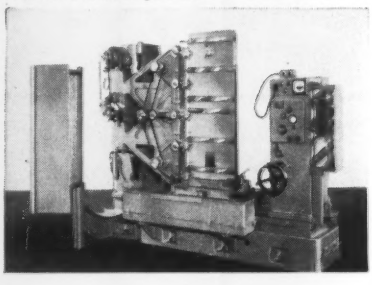


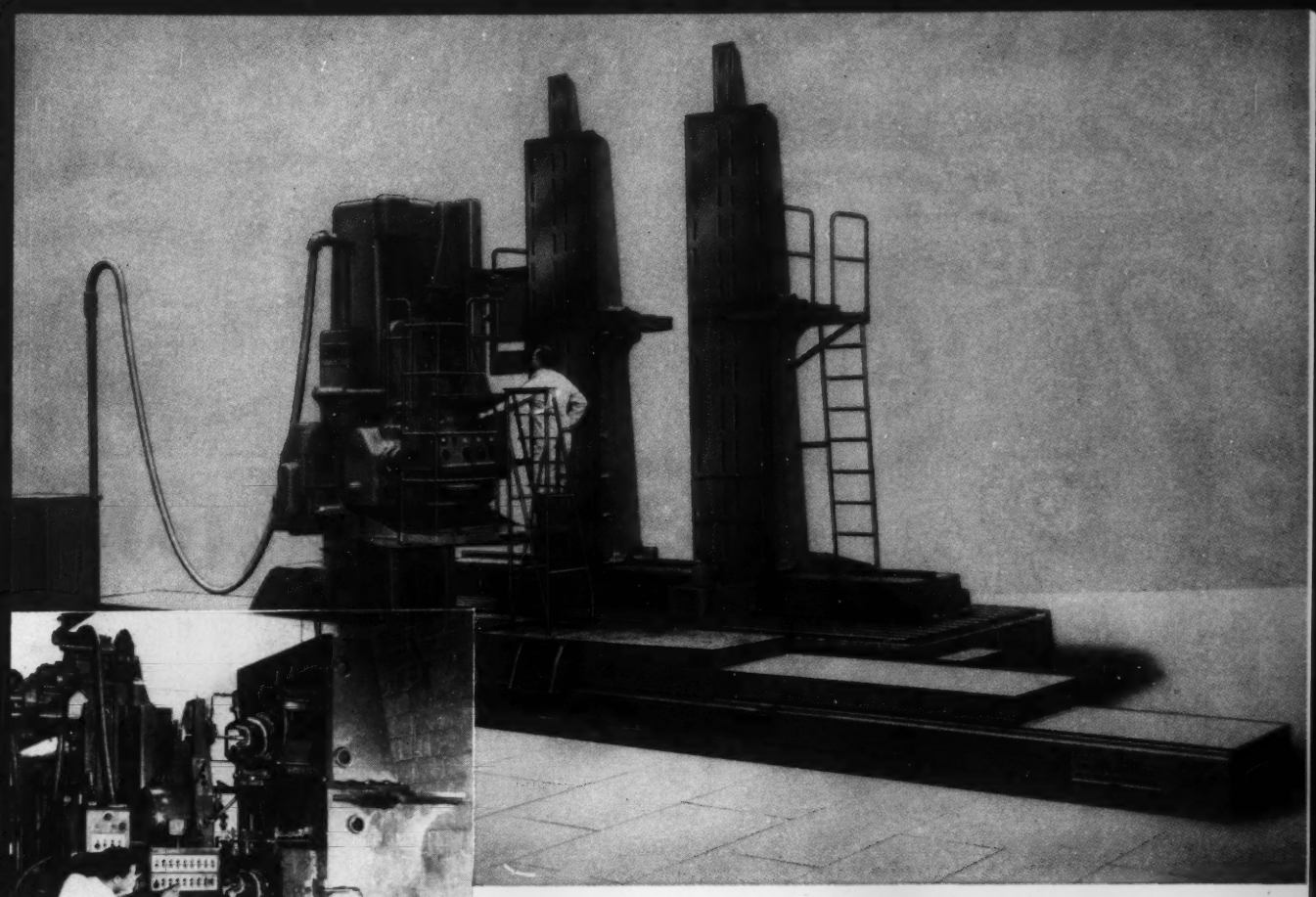
VELVETRACE® Kellering Machine

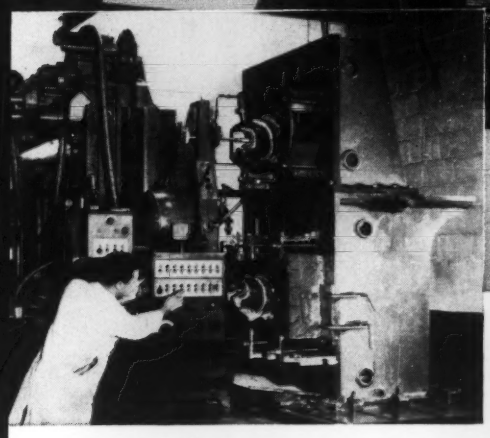
... Duplicates the finest detail with extreme precision. New, non-contacting tracer accurately follows any 3-dimensional model without touching it. Cannot damage the softest, most fragile models.

Automatic Duplicating Machine

... Specially designed for low cost production of forging dies and molds for glass and plastic. Automatically re-produces original dies and molds with precision and remarkable detail. There are two versions of this machine, one for machining bottle molds, one for forging dies. Supplied with 1, 2 or 4 cutter spindles.







Still Running Fine, BUT

TODAY'S KELLERS WILL BRING EVEN GREATER PROFITS.

You may put off replacing an older machine because "it's still paying its way." But is it? A machine tool purchased years ago may be the cause of lost efficiency, higher labor and per-unit costs, the inability to produce high quality *economically*. Failure to compete profitably with more modern machines may be putting you far behind your competitors. For example, just 10 short years ago our Keller BG-2 Tracer-Controlled Miller was the ultimate in productive efficiency, but let's check the added features possessed by its successor, the new P&W BG-22 Keller . . .

1. Operates from any conventional polyphase current, with no motor generator set required.
2. Increased travel speed of cutting tool . . . to an infinitely variable range from 0.5 to 30.0 inches per minute.
3. Three dimensional tracer permits motion in 2 directions at the same time, yet allows interlocking action for accuracy. One slide is kept always in motion, while the second moves as required to follow the shape and maintain accurate interlocking action.
4. More nearly perfect surface cutting speed over irregular contours assured through superimposed auto-speed control of all motions.
5. Increased capacities . . . up to 20 feet horizontal x 7 feet vertical.
6. Centralized operator controls supplemented by remote control stations.
7. Rapid traverse in all three motions.
8. Automatic lubrication.
9. Score-proof phenolic bearing surfaces on all slides and lead screw nuts.

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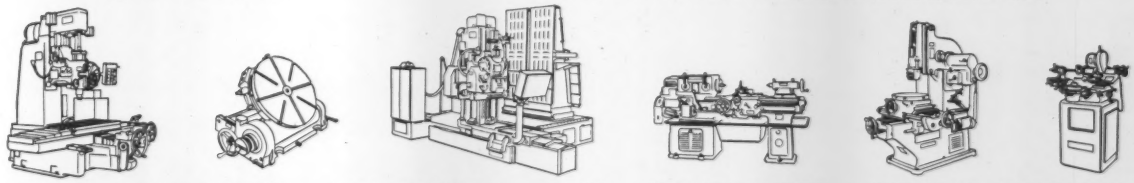

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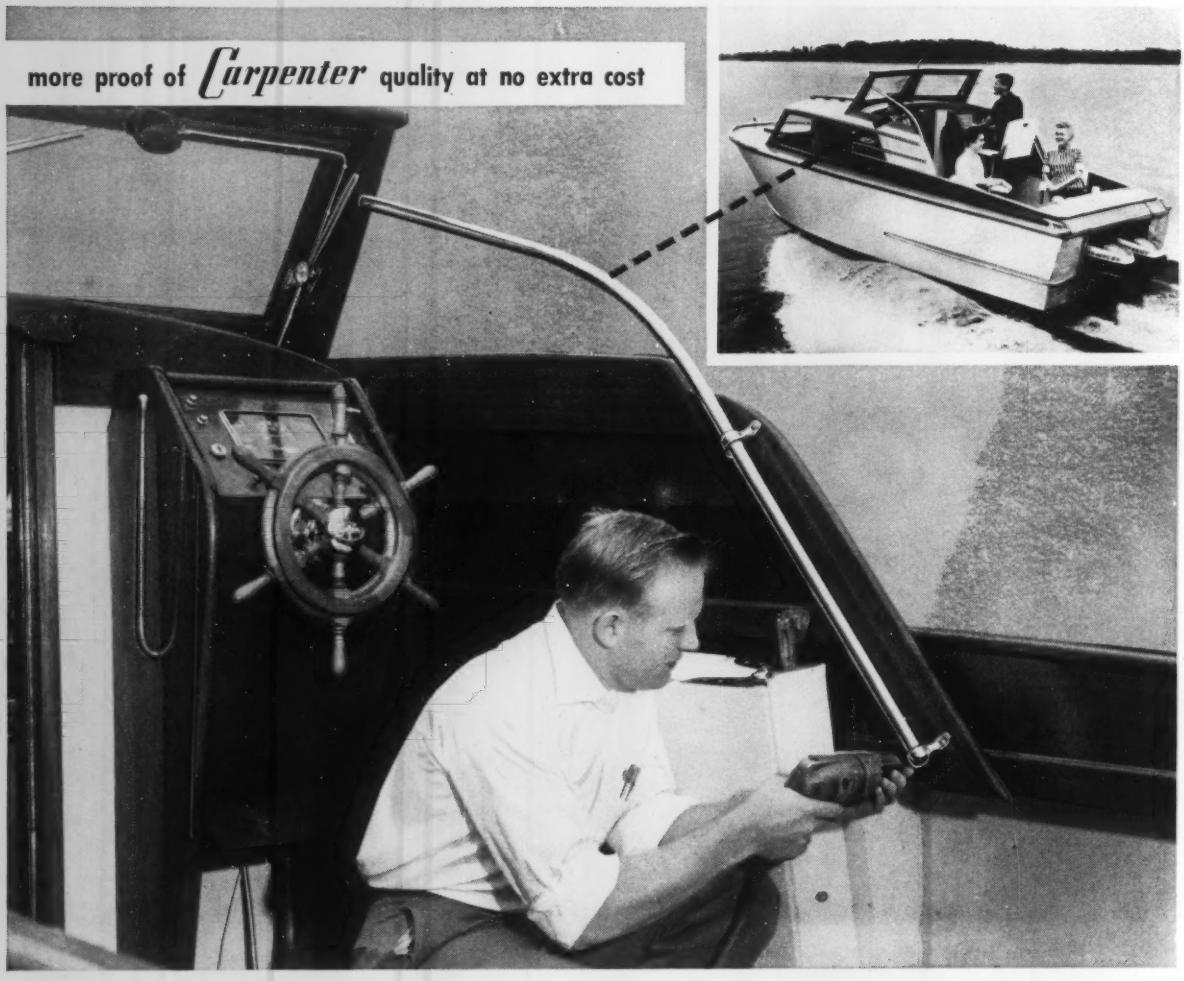
PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS



Costs cut 25% on boat handrails by switching to *Carpenter* Stainless Tubing

● Note the reasons why a 1957 line of 22-foot pleasure cruisers features gleaming stainless steel handrails:

By changing to Type 302 Carpenter Stainless Tubing, time and costs of making the handrails has been reduced 25%. Better bendability, improved appearance and no plating to peel in marine atmosphere are other important advantages gained. The tubing is 1″ O.D. with 18-gauge wall thickness, and 180-grit polished finish, in 22-ft. lengths.

The boat builder reports that Carpenter Stainless Tubing bends around a special 30-in. radius jig with less spring-back and shows no kinks or marks from bending. For maximum attractiveness, it is polished on a 240-grit and buffed.

Get this cost-saving quality and workability of stainless tubing for your products or equipment by calling your nearby Carpenter Distributor. He's at your service on over 30 different stainless and specialty analyses in a wide range of sizes, gauges, shapes and finishes . . . for pressure, mechanical, structural and sanitary services.

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more than corrosion resistance

Stainless Tubing & Pipe

Hard Hitter

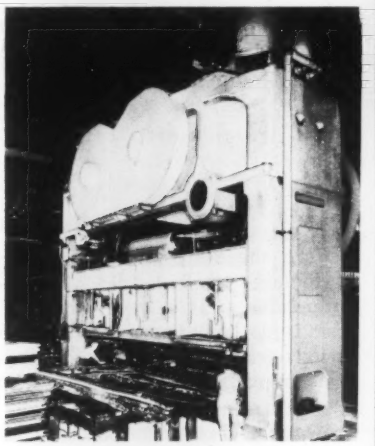
Installing a larger press can save money. Here's how one firm benefited from the change

A 4000-ton press forms side rails for bus chassis frames in one operation. It formerly required two.

Made by the Hamilton Division of Baldwin-Lima-Hamilton Corp., Hamilton, O., the press forms the rails without a camber or bow and eliminates intermediate and final straightening.

Other advantages are fewer die changes, no storage of partly formed stock and less material handling.

Fast Pace—The side rails are made by Midland Steel Products Co., Cleveland. Because of the advantages of single forming, the firm transferred most of its production on the larger side rails from its Detroit plant.



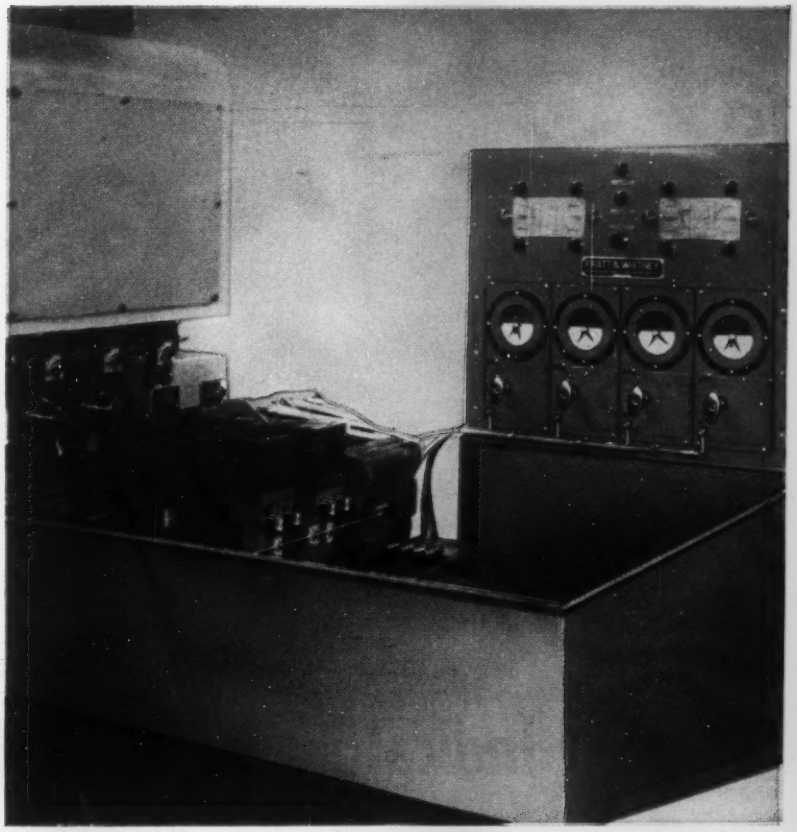
BLANK
. . . fed flat for forming

Low carbon steel is used for the blanks, some of which is 26½-ft long and ¾-in. thick.

On a 3000-ton press, the blanks used to be formed twice. Partly formed rails were stored and fed through a second time.

"Maintenance is not difficult," says J. J. Muffler, master mechanic. A built-in lubrication system assures correct distribution.

The press is a single-action, two-point type. It's more than 43 ft high, 30 ft wide and 12 ft high. It weighs 900 tons and is driven by a 1200-rpm, 150-hp motor. The flywheel runs at 310 rpm. Stroke is 22 in.



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FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS

Here is information for the man who specifies or buys gaging equipment, Discussed are equipment, design versus cost, multiple dimension and continuous gaging

Plug-type hole gage has interchangeable plugs for checking diameter, bell-mouth, taper, out-of-roundness. Trigger contracts gage contacts

Dial Indicators Lower Gaging Costs

By STANLEY DEGROFF
Manager, Mechanical & Air Engineering Dept.
Federal Products Corp.
Providence, R. I.

ALL GAGING — whether it's mechanical, pneumatic or electrical, manual or automatic—serves one primary purpose: To insure that part size falls within specified limits.

Precision in manufacturing, needed to assure interchangeability of parts, is not an exact quality. Machines cannot make perfect parts. They wear, materials vary, and operators, in adjusting both machines and tools, cannot make absolutely perfect settings. Precision is relative.

Tolerances—The design engineer, the tool engineer and the man in the shop must resort to limits of accuracy and to manufacturing and gaging equipment that will give and check the established limits, or tolerances. When thousands of duplicate parts are made, the gaging equipment must exercise close control over the manufacturing process.

The degree of control and the precision of the gaging operation, depends on the degree of precision demanded of the product. In modern manufacturing processes, tolerances in thousandths of an inch are no longer considered close; those in ten thousandths are now common, and, in some manufacturing and in the research laboratory, many measurements must be made to millionths.

Gage Selection — Measurements can be made by various gaging methods. Fixed-limit gages—plug, snap, ring, taper, spline, length, depth and similar types — can check dimensions in thousandths.

When tolerances become smaller, the gage designer must turn to indicating gages or other precision systems. Indicating equipment also has certain advantages over the fixed-limit gaging systems for the larger tolerances.

Selection Factors — Determining what gaging equipment to use depends on more than the ability to gage to the specified tolerances. Modern shops require that gaging equipment be fast, definite and dependable, that it keep scrap and rework at a minimum, that it avoid serious production delays, and that it do all this at a moderate, even low cost.

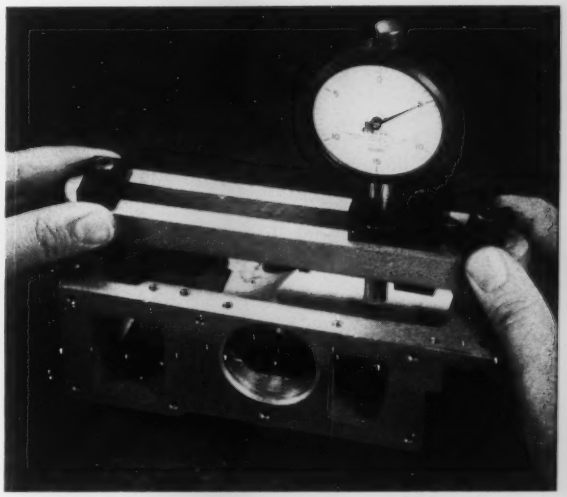
Mechanical gaging with dial indicators meets those requirements. And it does so with a reject rate and at a cost that is low compared with other types of gaging equipment.

Limited — Fixed-limit gages, the common "go-not-go" types, show only whether part size lies within tolerance limits. More than that is needed to keep scrap loss low.

The machine operator should know how his machine is trending. Is it steady? Is it beginning to drift toward the low or high limit? Or is it so erratic that quick attention is needed? While a fixed gage may show a part oversize, it does not tell the operator how much it is oversize to guide him in finishing the job.

Eliminate Errors — Indicating

Adjustable inner-outer diameter gage measures shallow holes, bores, shoulders. Contact is reversed for checking inner or outer diameters



Depth gage is completely adjustable. Designed for the production line or final inspection, it is superior to adjustable flush-pin gages

gages supply precise information on the dimensional characteristics of the workpiece. By doing so, they can stem the loss from high scrap rate, salvage and rework.

The effect of outsized pieces sometimes goes beyond the department that may let them pass or try reworking them, only to wind up with parts that may gage to the right diameter and yet be tapered or out of round.

Such errors may be magnified in subsequent operations or cause additional errors by providing inaccurate locating surfaces from which subsequent gaging is done. During assembly all the inaccuracies come into focus when parts refuse to go together easily and assembly costs mount rapidly.

Indicating Gages — Selection of indicating-gage equipment depends on the accuracy required, cost and versatility of equipment, and gaging requirements and conditions (how and where the gaging will be done, how many pieces an hour, condition and material of the workpiece and accessibility of dimensions to be gaged).

Because air gages, as a rule, are more precise than dial-indicator gages, they generally are preferred for gaging total tolerance variations of 0.0005 in. or less. While dial-indicator gages can measure readily to 0.0001 in., they generally are used for greater total tolerances. Some companies set up definite limits to guide gage selection, such as all tolerances expressed in 0.0001 in. to be gaged by air.

An air gage definitely may be indicated by the gaging speed required, the degree of skill available, the accessibility of dimensions to be gaged. In some cases, an operator can apply an air gage faster than he could a dial-indicator gage and with no special skill required. And some pieces to be gaged may have small, deep recesses that might be more accessible because of the mechanical structure of the gaging unit of an air gage.

Cost — But when an air gage is not definitely indicated as the better for the job, cost may become the governing factor. Dial-indicator gages generally cost less than air gages.

Cost of the dial indicators themselves is low, compared with the cost of the air gage, whereas the cost of air-gaging units (plugs or rings) can approximate that of a dial indicator mounting fixture. There is additional cost in installing necessary air service to operate an air gage.

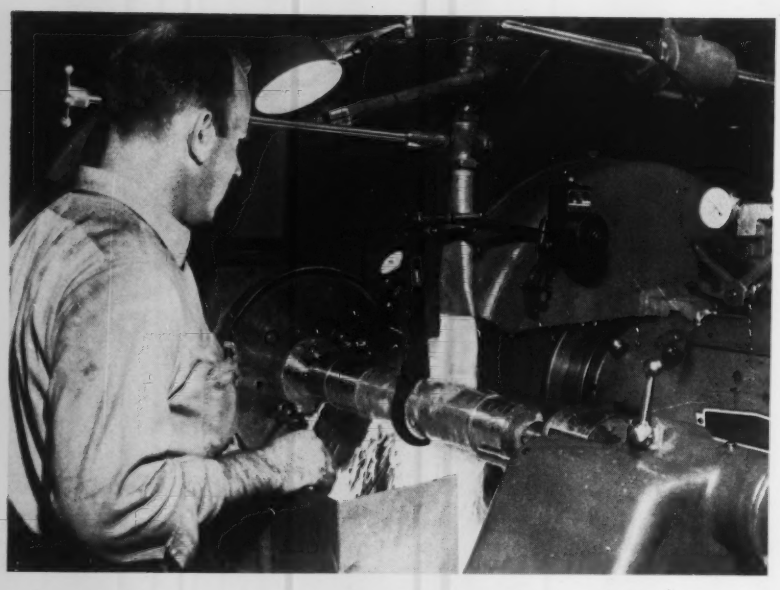
Gage Design—In considering cost of gaging, more than the initial cost of the equipment affects selection and design. Even after a definite selection has been made, gage design can be directed toward a low first cost only, or it can be directed to ease and speed of use and its effect on long-term gaging cost.

The number of parts to be gaged may govern the design. Many precision parts are made in small lots of duplicate parts. If gages are used that are unnecessarily fast or convenient, gaging may become unnecessarily expensive. A small number of parts ordinarily limits selection to a cheaper gage with fewer refinements and a correspondingly higher labor cost for its use.

Exception—But a "small number" in one industry can mean something different in another. A pilot run of 1000 parts may be considered small, while a run of that size in another company might be large. Much depends on how drastically product design might be changed after the pilot run. Government contracts often call for costly gages on pilot runs, with the expectation that they will be used later on production runs.

Buyers also have their particular fancies. Many think a gage should be proof against misuse, that it should supply the "brains" that the operator is supposed to have. Such gage design is costly, although long-term gaging cost may be low.

Other buyers appreciate practical gage limitations and demand a less positive approach. Equipping a concentricity gage with a



Indicating grinding gage shows diameter of workpiece as it is ground; the operator doesn't have to stop his machine. It also can indicate widths for face grinding

precise, positive clamp, for example, may result in an involved design and a difficult manufacturing problem. The tool engineer who understands such limitations will accept a less complicated and less costly gage and have the operator take greater care but spend more time in its use.

Sensitivity—As a rule, the greater the precision required of a dial-indicator gage, the more it will cost. Some dial indicators will read to 0.0001 in. within one graduation. Supersensitive dial indicators are graduated to 0.00005 in. When exceptional accuracy and faithful "repeatability" are required of an indicator, it is wise to tell the manufacturer your precise requirements and ask him to supply an indicator that will meet such special needs.

Many users prefer the higher-cost indicators for gaging fairly large tolerances. Their greater magnification causes a wider movement of the indicator hand; the result is better gaging accuracy if measurements are made near tolerance limits.

Concentricity — Sometimes, it is best to select a dial indicator of lower magnification. This might be so in gaging concentricity or dimensions of thin-walled workpieces, flexible materials, or small-diameter parts that deflect easily.

In checking concentricities, the changes in diameter may not be followed accurately by indicators unless they are sensitive and have minimum inertia so they can follow gradual changes in dimensions. A lower-magnification indicator usually has less inertia in its movement and shows concentricity changes with better faithfulness.

Parts that are flexible or easily distorted might be better gaged with a lower-magnification indicator. Such indicators exert less pressure on the workpiece because they have a lower gear ratio.

Multiple Dimensions — Another factor that affects gaging costs is the number of dimensions to check at one time. Multiple inspection (measuring several dimensions at one time in one gage) can reduce labor cost even though the gage might be relatively expensive. Gaging is faster because the inspector handles the workpieces fewer times.

It can be made even faster by adding an electrical system. Lights or a sound system can be hooked up to the gage to indicate when all dimensions are within limits. When one or more are out of bounds, the electrical system spots the condition and the dial indicators show which dimensions are at fault.

Convenience — Not all multiple gaging is done to cut gaging costs. On some parts, one dimension depends on the accuracy of another as in concentricities of circular sections.

Another means of reducing part handling, and gaging cost, is to equip dial-indicator sorting gages with electrical equipment to distribute sorted parts. The gage may be a hand-feed comparator that shows part size. Ordinarily, the inspector, after gaging a part, would have to distribute it to the proper container. An electrical hookup can operate a series of gates in a discharge chute to direct each part inspected to its right destination.

Continuous Gaging — Still another means to cut gaging cost is to reduce or eliminate handling of the gage by the machine operator. In grinding operations, this can be done by use of a continuous grinding gage mounted on the wheel guard. The gaging member rides on the work and measures it as it is ground. A dial indicator on the main frame of the gage shows work size at all times.

Such a gage eliminates scrap by precise, continuous size control. Both grinding and gaging are faster; the operator doesn't have to stop the machine to gage the part. With the exact diameter always visible on the dial indicator, parts are ground uniformly, to ± 0.0001 in.

Diameters — Gages of this type measure widths in face-grinding operations, and combination gages can measure both diameters and widths.

The gaging member, in the form of a caliper, can be a fixed unit and measure one diameter only, or it can be adjustable for a range of diameters. The adjustable caliper is recommended for grinding operations when change-overs in diameter are frequent. Special calipers with long contact surfaces can gage external surfaces with keyways, splines, or other grooves. A caliper side contact attachment locates the caliper laterally for checking tapered work.

Widths — When widths only are measured, the caliper serves as a

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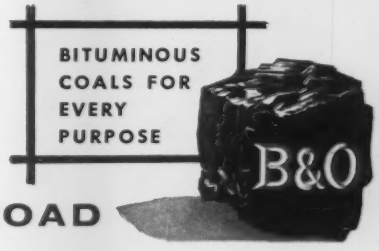

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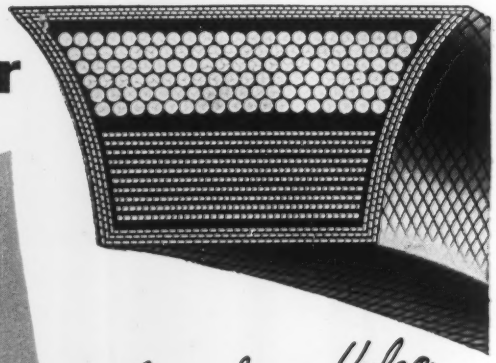
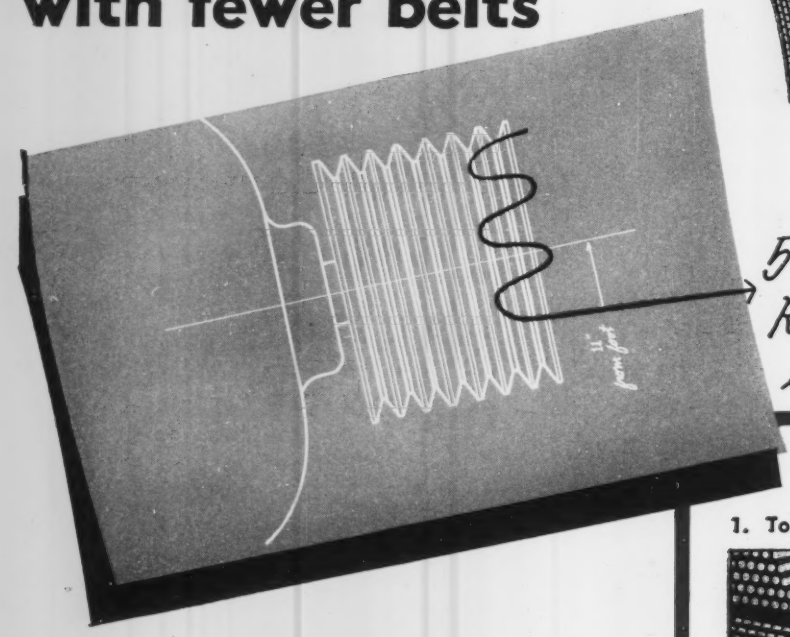
get same horsepower with fewer belts





5 Gates Super Vulco Ropes do the work of 7 standard V-belts

Where space is limited and weight a factor, design your drive with this important fact in mind:

5 Gates Super Vulco Ropes do the work of 7 standard V-belts

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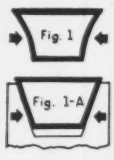
2. Concave Sidewalls (U.S. Pat. 1813698)



Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Flex-Weave Cover (U.S. Pat. 2519590)

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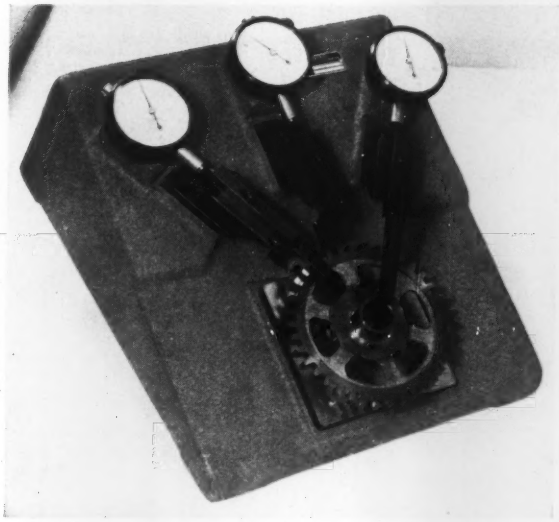
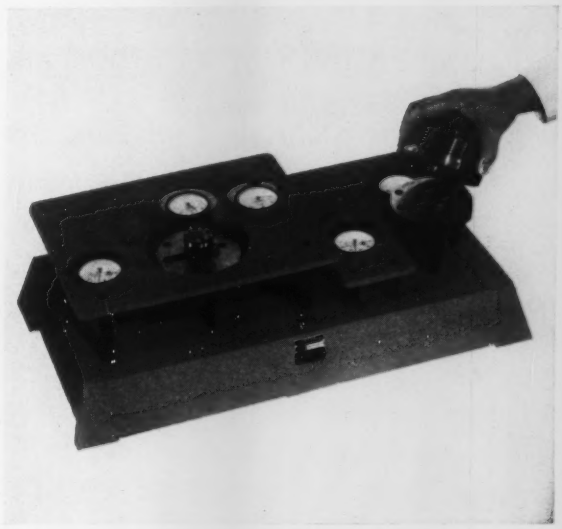
TPA 248

Gates Super VULCO ROPE Drives



Multipurpose gage measures three dimensions on a gear at one time. Pantographs transfer vertical motion of gaging members to horizontal motion on indicator racks



Multistation gage measures three dimensions in one station and two in second. Design as multistation gage avoids space limitations on dial-indicator placement

guide to hold the gage to the work. An adjustable reference contact arm, linked to the dial indicator, measures the width, internally or externally, between shoulders. If the measurement is to be made to one shoulder only, a post may be fastened to the machine table to act as a reference surface.

Several diameters on the same workpiece can be gaged by a setup of several gages — one for each diameter. These are readily interchanged on the same gage mount.

This type of grinding gage can be converted to machine control by adding an electrical unit, such as the Federal Electricator. Mounted in place of the regular dial indicator, this unit (an electric switch combined with a dial indicator) controls the wheelhead feeding mechanism through a power unit.

Stock Gages — Dial-indicator gages are accurate enough for most gaging requirements; they are adaptable to many conditions, easy to read, and economical in first cost and maintenance.

Among those in common use are many types of more or less standardized gages, such as indicating snap (which may be adjustable, nonadjustable or retractable), outer and inner diameter comparators; single-dimension or adjustable gages, depth gages, thickness gages and general purpose comparators.

Modified Gages — Stock gages may be modified to suit unusual requirements. Modified versions of basic designs can often save users time and money by eliminating the expense of designing and building new special gages. Some process engineers specify costly special gages for jobs that could be done as readily, and more economically, with modified gages. In many cases, they design special gages for gaging problems that already have been solved by gagemakers.

Nevertheless, the special gage offers the greatest opportunity for reducing gaging costs and scrap rate. Special dial-indicator gages can make faster, easier, more accurate measurements of dimensions that are difficult to gage and, often, multiple in number.

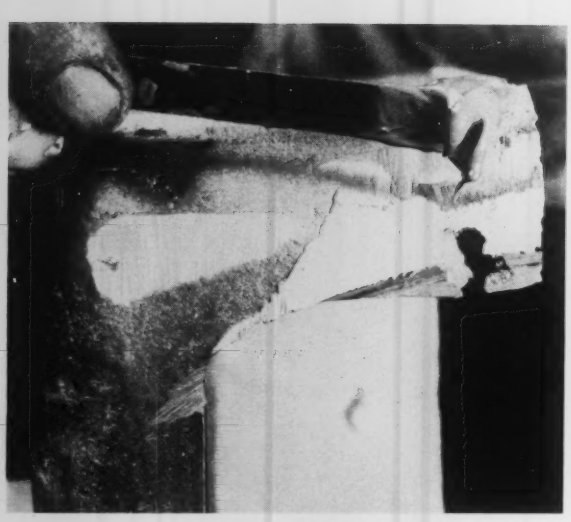
Specials — Gages for measuring multiple dimensions may be multipurpose or multistation. A typical multipurpose gage is one designed for an engine manufacturer to measure three dimensions on a gear simultaneously. The gear is located on a reference platen. One dial-indicator arm projects over the top of the hub to gage its over-all height. A second measures the distance from reference platen to the underside of the gear face. The third measures from platen to the top of the opposite face.

To transfer vertical motions of the gaging members to horizontal motions on the indicator racks, each indicator is connected to its gaging arm through a 45 degree pantograph. This mechanism is two parallel steel plates supported by four parallel strip springs. Pantographs also permit gaging of dimensions difficult or impossible to reach directly by dial indicators.

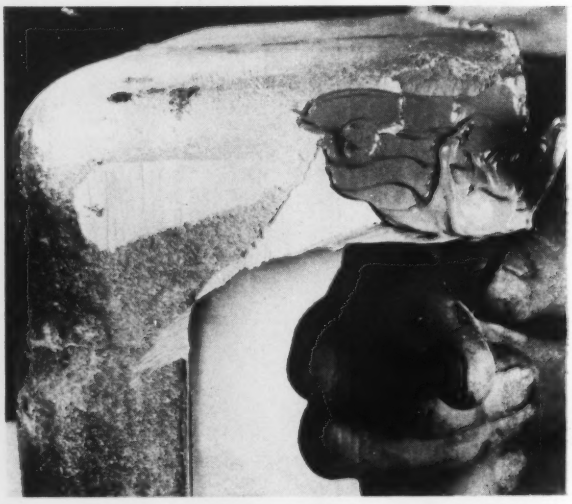
Multistation — A typical multistation gage (it speeded gaging of rocket heads) measures three dimensions in one station and two in the second. The first station checks the depth of two shoulders and the minor diameter of a thread; the second checks two internal diameters. Its design as a multistation gage avoided two conditions often faced in a multipurpose gage—space limitations for the dial indicators and gaging elements working against each other.

While the trend in special gage design is toward the multipurpose unit to save handling time, the gage designer must still balance labor cost against complex design and higher initial cost.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



Metallic putty is applied to a hole (caused by a crush) in an aluminum casting for an outdoor theater ramp sign box



Finishing off the patch. After it has cured, it will be machined to the same smoothness as the surrounding area

Epoxy Compound Saves Foundry Work

Metallic putty can be used to salvage defective castings, cement gates to patterns and build up pattern walls. It is easy to use, can be applied with any flat tool

AN EPOXY resin compound containing powdered aluminum has proved to be a versatile and valuable tool in the production of aluminum castings for industrial and consumer products.

It's being used by the Southern Casting Co., Sevierville, Tenn., to salvage defective castings, cement gates to patterns and to make modifications in patterns. It has been used to calk metal air lines carrying 130 psi.

Repairs Castings—Called Metalset A2 and manufactured by Smooth-On Mfg. Co., Jersey City, N. J., the metallic putty was tested by Southern Casting chiefly as a patching material. But it has proved to be a good material to repair imperfect castings that are for non-structural uses.

Savings—The chief advantage of the patching compound is not in the number of rejects saved from the melt pot. Of greater importance is the fact that any man in the shipping and cleanup departments can make an acceptable repair using Metalset. Compared with aluminum soldering, the material cost is about cut in half, and the job can be done in about one-third the time.

Chemical Cure—The epoxy compound is easy to mix and use. It comes in two parts—the basis resin containing the powdered aluminum and the liquid curing agent.

Curing is by polymerization and shrinkage is 0.002 in. per inch. Other physical properties include a compressive strength of 14,400 psi and a Rockwell hardness of M-70.

Must Use Fast—When mixed, the material should be used within half an hour. It will stay where it is placed, horizontally, vertically or upside down. It can be applied to a clean surface with almost any sort of flat tool.

Since it hardens through an exothermic chemical reaction, and the heat given off speeds the curing, the material should be applied heavily. The patch cures in a few hours at room temperature and any excess can be removed by filing or grinding.

The short usable life of the mixed material promotes the repair of negligible defects that normally would not be cause for rejection. Appearance is upgraded accordingly.

The gates for this chair leg pattern were cemented in place with the epoxy compound. When cured, it has a shear adhesion of 1080 psi at room temperature

Ski lift operators stress safety when it comes to buying wire rope. Too many lives are at stake. So they buy . . .

A Safe Lift

Even though you don't operate a ski lift, false economy can be costly in your rope purchases, too. For a rope failure can cause personal injury . . . wreck your equipment . . . throw off your entire work schedule . . . and affect employee morale. Yes, a "bargain" wire rope may save you money, yet cost you your peace of mind. Don't take a chance. Buy a rope that's a quality rope—buy Wickwire Rope.

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WICKWIRE SPENCER STEEL DIVISION — Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans
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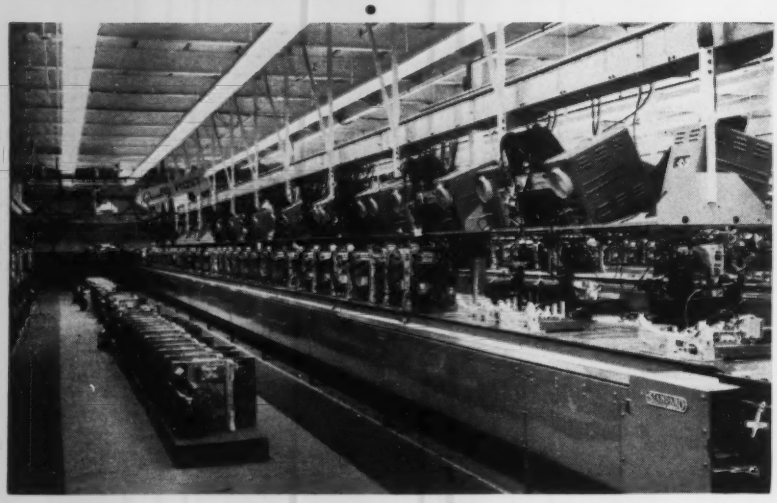
Ask Standard

how to cut costs with conveyors



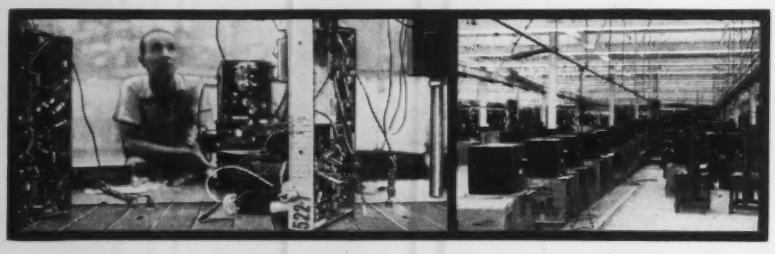
TV chassis move along Standard slat conveyor at right center. Job-tailored design assures uninterrupted, smooth work flow . . . helps manufacturer achieve high degree of automation despite complexity of operations.

Mile-long conveyor system speeds TV production line

IN this TV plant, Standard engineers designed and installed more than 2800 ft. of belt and slat conveyors as part of a mile-long conveyor system.

It's a typical example of how Standard engineers will work with you and your engineers to increase automation, cut costs through more widespread use of conveyors.

And, because Standard produces a wide range of permanent or portable gravity and power conveyors — in roller, belt, slat, chain, wheel push-bar and sectional types — you can be sure their recommendations will be unbiased. When you plan any materials moving system, be sure to call or write STANDARD CONVEYOR COMPANY, General Offices: North St. Paul 9, Minnesota.



Left photo shows closeup of slat conveyor. Note integral electric sockets for circuit testing. At right, completed sets move along Standard wire-mesh floor belt.

Contact the Standard engineer listed in your classified phone book. Or, write for free catalog. Address Dept Y-6.

Standard 50 years of conveyor experience

GRAVITY & POWER CONVEYORS

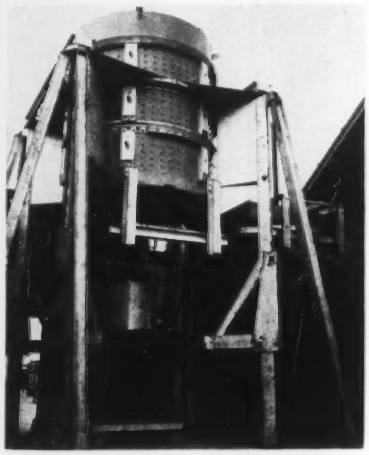
Sales and Service in Principal Cities.

Brazing Furnace

Special elevator-type unit developed to join stainless honeycombs at 2150°F

SOLAR Aircraft Co., San Diego, Calif., is brazing its Solite stainless steel honeycomb structures in a special electric furnace.

Built by Pacific Scientific Co., Los Angeles, the elevator-type unit is more than 35 ft high and has a muffle box that is 6 ft in diameter and 6 ft high. The furnace is large enough to accommodate full size airframe and engine sections. For easier loading and unloading and fast cooling, the door of the furnace can be lowered and swung out of the way.



ELEVATOR FURNACE
. . . has 6 x 6 ft nickel alloy muffle

Nickel Alloy—The muffle box and the loading forks on which parts are hung are made of Inconel nickel-chromium alloy to withstand brazing temperatures which may reach 2150°F. Fan blades for the furnace blower and the grid support for the muffle also are Inconel.

All phases of the brazing operation are carefully controlled to assure strong, sound joints throughout the thousands of tiny cells that make up the composite honeycomb structure. Temperatures are closely controlled; heat is distributed uniformly throughout the heating chamber; and the atmosphere is maintained at almost absolute purity to protect parts from atmospheric contamination.

better living

When you make anything in metal for homes, kitchens and appliances, and you want enduring beauty and sales appeal in your product . . . design it, improve it and protect it with McLOUTH STAINLESS STEEL.

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HIGH QUALITY SHEET AND STRIP

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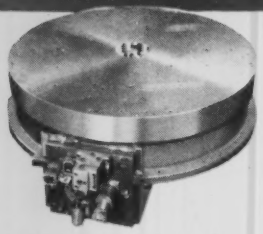
MANUFACTURERS OF STAINLESS AND CARBON STEELS

THIRTEEN STATION AUTOMATIC TRANSFER MACHINE

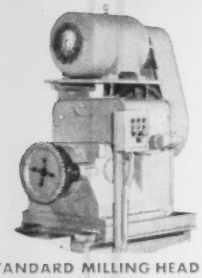
— mills, drills, reams, spotfaces, taps and saws apart cast iron bearing cap blocks. Machine includes 5 standard feed slides, 9 standard production units.

Because major components are standardized

KEARNEY & TRECKER TAKES THE "SPECIAL COSTS" OUT OF PRODUCTION MACHINE TOOLS



STANDARD ROTARY INDEX TABLE available in 4 different table diameters, any practical number of indexes.



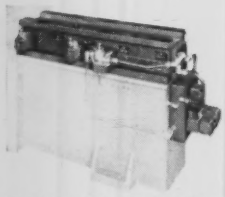
STANDARD MILLING HEAD UNIT 4 sizes. Single spindle . . . various horsepower and speed ranges . . . single or double reduction drive . . . automatic quill retraction. Any size can be modified for boring.

Here's a sound, proven *economical* approach to your production machine tool problems . . . Kearney & Trecker production machine tools featuring standardized components.

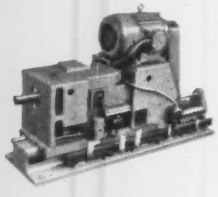
You get IMPORTANT SAVINGS—benefit directly three ways: (1) lower initial cost; (2) less lead time needed and (3) proven standard units mean efficiency *plus* simplified machine maintenance.

Ask the Kearney & Trecker man—he'll show you more examples of standardized machine components in production machine tools — the keys to capturing more profits from production!

Kearney & Trecker Corp.
6790 W. National Avenue, Milwaukee 14, Wis.

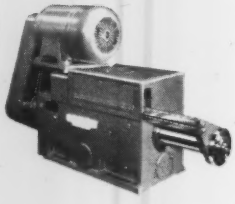


STANDARD FEED SLIDE UNIT provides hydraulic feed for milling, boring or drilling heads. Available in 4 sizes and in various length cylinder strokes.



STANDARD WAY TYPE DRILL UNIT for drilling, boring, reaming, counter-boring and chamfering. Single and multiple spindle arrangements, single or double feed rates.

ASK FOR FREE KEARNEY & TRECKER Production Machine Tools Bulletin SMD-57. It provides full standard component details — and their application to production machine tools.



STANDARD QUILL FEED UNIT for drilling, boring, reaming, spotfacing, counter-boring and chamfering. Single or multiple spindle arrangements — single or double feed rates.

KEARNEY & TRECKER MILWAUKEE ®

Designers and Builders of Precision and Production Machine Tools Since 1898

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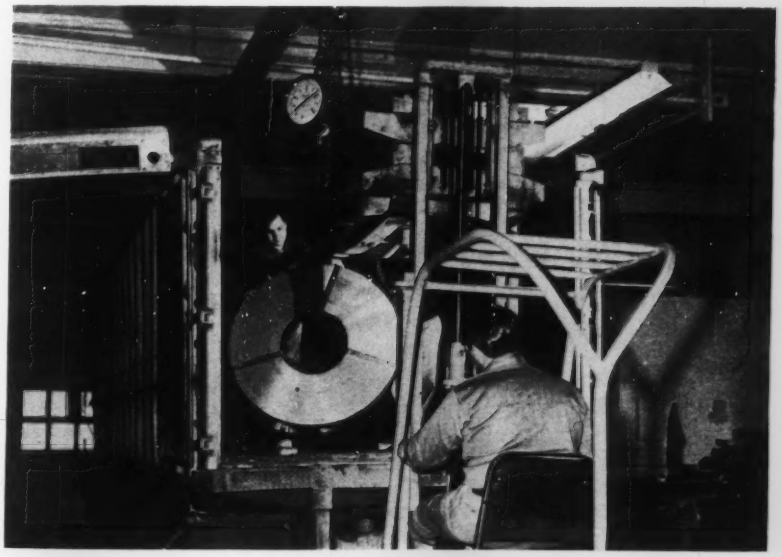


Unloading 1500-lb coils of steel is a simple job with a Yale hoist and fork truck working as a team

Fork Truck, Hoist Cut Handling

They can do more than solve production problems. This plant uses them for maintenance, die setups and similar odd jobs. Stacking is no problem—it increases available storage space

LIFT trucks and small hoists are an economical answer to material handling problems in small plants.

Steel Slides Inc., Yonkers, N. Y., uses a ton of steel every 40 minutes. Handling in an area of less than 10,000 sq ft calls for something more than hand methods.

Process—The building has no loading dock. Trucks are driven into the plant to unload raw materials and load finished slides.

Coils of steel, which weigh between 1500 and 1800 lb, are unloaded with a 1-ton hoist. One man operates it, weighing and tagging each coil.

The hoist places the coil on the forks of a Yale & Towne lift truck. Each one takes about 6 minutes to unload. They are stored in stacks, nine high.

The lift truck also transports coils from storage to a Yoder cold roll forming machine.

Packing — Emerging from the production line, slides are placed on stainless steel racks. For corrosion resistance, they are immersed in Parco compound, Endurion and a lubricant.

As soon as the parts are removed from the chemical tanks, they are assembled and packed in corrugated paper cartons. Finished cartons weigh between 400 and 500 lb.

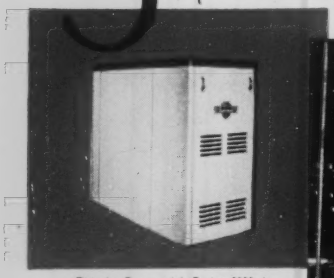
Placed on skids, cartons are moved by a hand powered lift truck to the loading area. The fork truck picks up the skids and places them on the truck bed. Another hand powered lift truck shifts the skids into traveling position on the truck.

Two men can load 31 cartons in half an hour. Without the lift trucks, the job took over 4 hours.

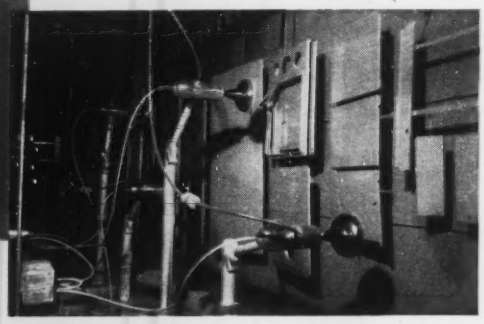
Other Uses—The lift truck helps out in other ways. It handles chemical drums, packaging materials and the dies for the Yoder machine.

During a recent move, the truck moved machinery and carried out loads of scrap.

3 times as many Furnace Casings per gallon of paint with RANSBURG NO. 2 PROCESS!



This Lo Boy model, Series 6000, is typical of the Waterman-Waterbury line of winter air conditioners now painted electrostatically.



Quality of work is improved; Labor costs are cut and Production Stepped up 150% with

RANSBURG *Electrostatic Spray Painting*

Results exceeded expectations when Waterman-Waterbury, Minneapolis, modernized their finishing department and went from hand spray to Ransburg No. 2 Process in painting their quality line of heating and air conditioning equipment.

By the former hand spray method, W-W used a half gallon of paint to coat a single casing. Now, with Ransburg No. 2, they get SIX CASINGS PER GALLON . . . or 3 times as many per gallon. Furnace casings, as well as other painted parts which go into the famous Waterbury Furnaces, now get a uniform coating of .8-mil.

Production was increased, too, as automatic painting enabled them to step up the conveyor speed from 7 fpm to 11½ fpm. Where they formerly turned out a complete furnace in five minutes, NOW they assemble three in just six minutes . . . an increase of 150%. All in all, they figure the modernization program—with Electro-Coating—saved over $11,000 in the first three months of operation.

NO REASON WHY YOU CAN'T DO IT TOO!

Whatever you paint, we'd like to tell you more about the efficiencies and worthwhile savings which can be yours with Ransburg Electro-Coating Processes. Get our No. 2 Process brochure which cites many on-the-job examples of electrostatic spray painting on a wide variety of products. Or, we'll be happy to loan you our new film, "The Big Attraction" which tells the electrostatic spray painting story in sound and full color.

Call or write

RANSBURG
Electro-Coating Corp.
Barth and Sanders, Indianapolis 7, Indiana

King-Size Cutter

Oxyacetylene torches slice plate stacks up to 26 in. thick. Length reduces down time

A FLAME cutting machine 124 ft long is reducing fabricating time on welded steel mill equipment made by Morgan Engineering Co., Alliance, O. It was designed and installed by the National Cylinder Gas Co., Chicago.

Feature—Flexibility, rather than length of cut, is the unit's most important feature, say NCG engineers. Idle time is reduced since cranes can remove one piece of work while another is being set up. Without such an arrangement, down time can run as high as 50 per cent.

The machine has three carriages. Two have four cutting torches each; the third has six torches.

Patterns are laid on the tracing table. The cutting machine carriages can cut work over the entire length. Operators run the machines from remote control panels.

LONG CUTTER
. . . handles stacks 26 in. thick

Steel Mill—Morgan manufactures electric overhead traveling cranes, roller tables for rolling mills and auxiliary equipment for steel mills.

One of the large jobs involves the shaping of 920 tons of steel for each of three 500-ton ladles. They'll go into a new steel plant in the East. The machine cuts bearing blocks more than 26 in. thick; 17-ton ladle hooks which are 17 ft long are made by laminating 13 steel plates into a stack 12½-in. thick. The entire stack is cut in one operation.

Machine Deburrs and Chamfers 600 Parts an Hour

Model BMED-14S is a universal machine which chamfers and deburrs gear teeth at both ends of a groove.

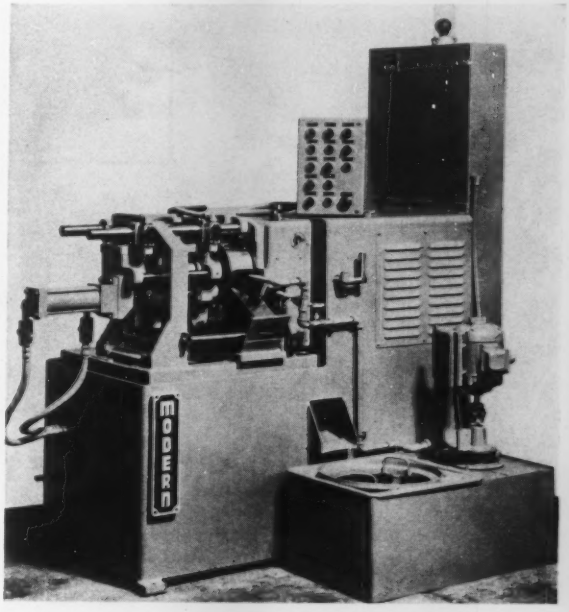
Special automation equipment cuts cycle times to six seconds. The basic machine handles spur gears and helical, straight-sided and involute-form splines with pitch diameters of ⅝ to 6½-in.

The automation equipment works off one air cylinder and four interlocked limit switches.

Parts are fed from a distribution system to a slide and chuted to a stop where they are checked by mechanical fingers for proper position. (If the part is misaligned, the machine automatically shuts itself off until cleared manually.)

Properly oriented parts continue through the chute and enter the index, one at a time. As cutters are stroked across the part face being chamfered, a pilot gear electrically counts the number of teeth.

When completed, the counter stops the machine with the cutters retracted. The part is then moved to the second work station where the other face of the groove is chamfered by the same method. *Write*: Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. *Phone*: Webster 3-7280



Washer Removes Chips and Cutting Oils from Parts

Parts in transit from one machining operation to the next are washed in this single stage machine.

Parts on a roller conveyor, on fixtures or in baskets are loaded into the cabinet. A control valve lever at the loading end closes sliding doors at both ends of the cabinet.

When the doors are closed, the pump is started and the parts are sprayed with a heated, recirculated solution.

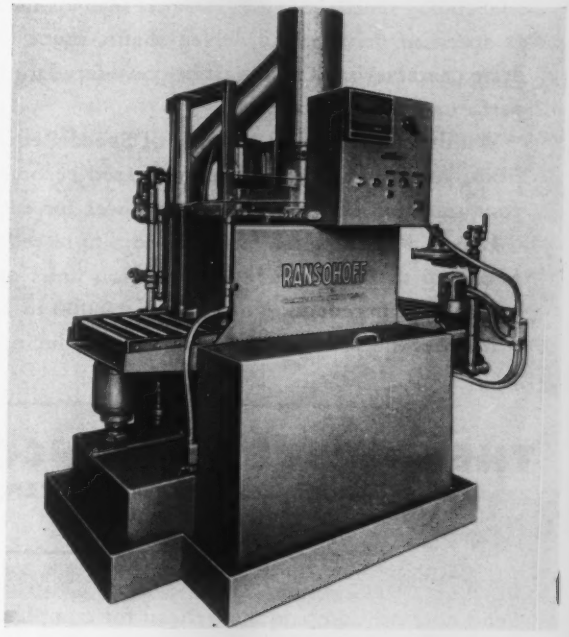
After the washing period, the doors are opened and a valve in the solution line automatically cuts off the spray.

The machine is 69¾-in. long, 54½-in. wide and 67 11/16-in. high. The largest part that can be cleaned is 30 in. long, 15 in. wide and 12 in. high.

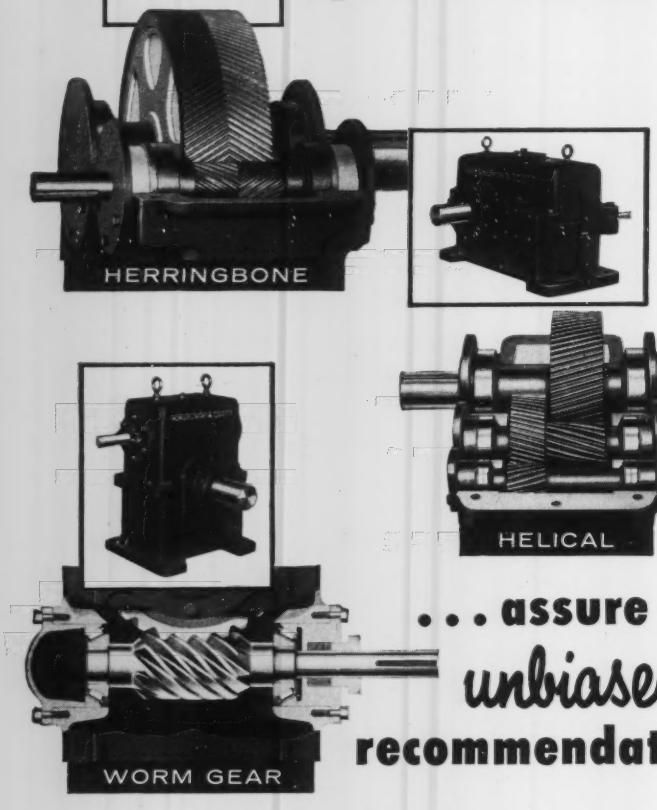
Steam or electricity can be used to heat the solution tanks.

A special drip pan and scavenger pump can be built in the unit if no waste disposal lines are available.

The machines also can be used where production requires the washing of an intermittent flow of parts or to supplement central cleaning equipment. *Write*: Ransohoff Inc., N. Fifth street at Ford boulevard, Hamilton, O. *Phone*: 3-5813



3 H&S Speed Reducers



. . . assure *unbiased* recommendation

Each of these three general groups of H & S Speed Reducers has its particular mechanical advantages which make it more efficient for specific duties. There are many considerations, such as speed of driving and driven shafts, shape of housing and drive characteristics that must be considered for lasting reducer performance and economy.

With the complete H & S line of Speed Reducers to choose from, you can be sure of our unbiased recommendation and your selection of the right type reducer for each specific job.

H & S Reducers are available in single reduction units in ratios up to 100 to 1; in combination units up to 700 to 1; and in double reduction units up to 10,000 to 1.

Make H & S your source for *all* speed reducing requirements.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

Send note on Company Letterhead for complete H & S Catalog

NEW PRODUCTS and equipment

Drilling and Tapping

The H-6 is a multiple-spindle machine that automates small lot production. It has preset selective cycle control and a straight line indexing slide.

Setting the selector dials makes available over 100 combinations of operations—drilling, tapping, step drilling, chamfering, countersinking, counterboring and spotfacing.

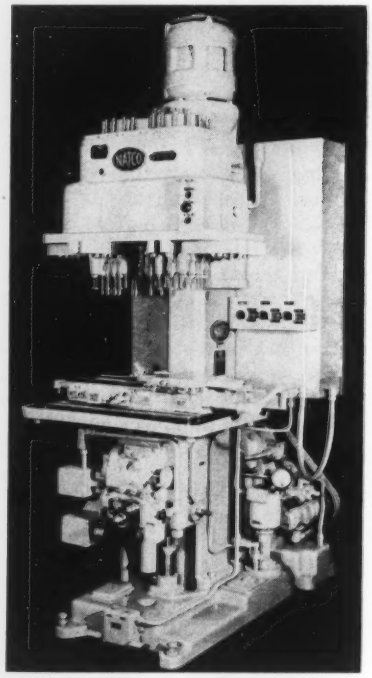


Table feeds are controlled by two dials, one for drilling and one for tapping. A vertical float arrangement built into the spindles makes it possible to use taps of different leads.

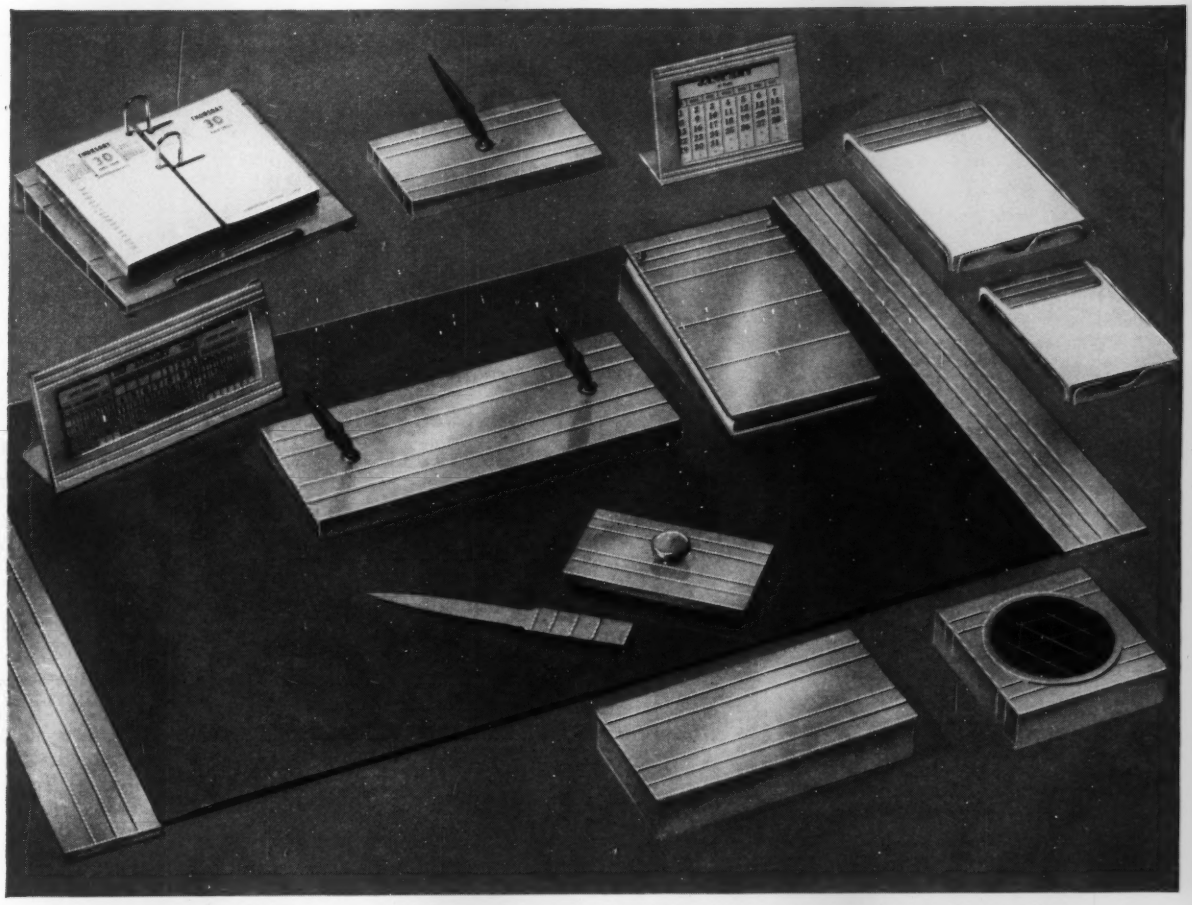
Up to 24 spindles can be used on the machine. *Write*: National Automatic Tool Co. Inc., Richmond, Ind. *Phone*: 2-1183

Shoulder Screws

These screws are upset forged and have unbroken and uniform grain flow assuring high strengths.

They come in diameters up to 2½-in. and in any length desired. Hexagonal head and a wide variety of intricate shoulder and other head shapes are available.

The screws are used as axles, mounting bolts, conveyor system



A few of the fine executive desk appointments made of Formbrite by Smith Metal Arts Co., Inc.

For a superfine luster that lasts—superfine-grain Formbrite

Smith Metal Arts Co. uses easy-to-polish, scratch-resistant Formbrite to add value to its line of distinguished desk appointments.

The fine executive desk appointments made by Smith Metal Arts Co., Inc., Buffalo, N. Y., are not just polished to shine. They are brought up to a beautiful deep luster. For their line of brass accessories they use Formbrite,® Anaconda's superfine-grain drawing brass.

They have found that the fine, uniform grain size of Formbrite enables them to give their pieces a superior, more uniform texture. The luster, furthermore, stands up better under handling because Formbrite provides a harder, more scratch-resistant surface.

In order to achieve this fine luster, Smith Metal Arts Co. must do an exceptional amount of polishing and they have chosen Formbrite because of its superior polishing characteristics. By using Formbrite they can achieve their high quality surfaces at savings of 20% over the use of ordinary brass.

See for yourself. Formbrite is a premium product at a nonpremium price. Find out for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you improve product quality, lower finishing costs. Write for Publication B-39. Better yet, ask for a sample or details on our trial order offer. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 3771

Formbrite
SUPERFINE-GRAIN DRAWING BRASS
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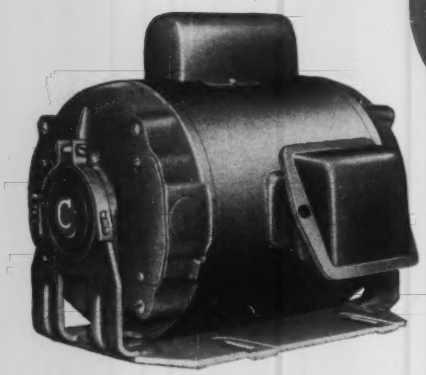
Your choice of normal or low starting current...

with Performance-Rated

Century

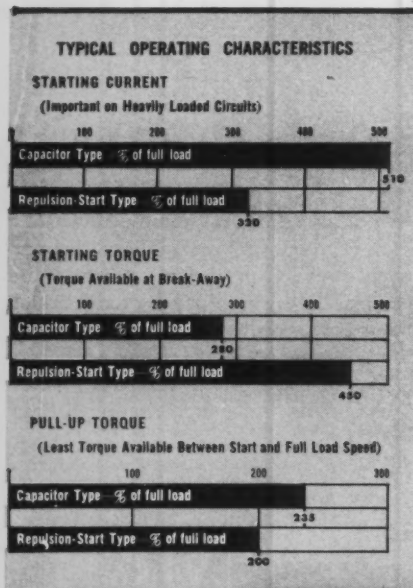
HIGH TORQUE, SINGLE-PHASE MOTORS

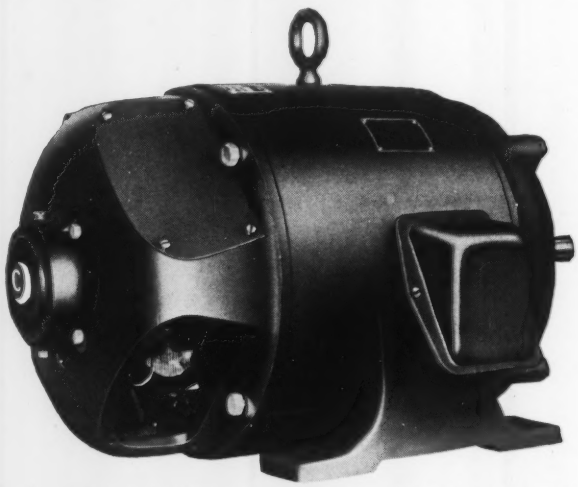


Capacitor Motors... ⅛ to 20 H.P. provide high starting torque, high pull-up torque and require normal starting current. They are available in drip proof, dust proof and explosion proof enclosures.

Even if you have severe starting current limitations, you can select the torque you need for sure starts and smooth pull-up to speed from the Century Performance-Rated Single-Phase line (see bar chart below for operating characteristics of two types of Century Single-Phase Motors).

Whatever Your Motor Job . . . there's a Century Motor Performance-Rated to handle it with top effectiveness. Contact your nearby Century branch office or Authorized Distributor.





Repulsion Start, Induction Motors (type RS)... ½ to 7½ H.P. provide very high starting torque, yet require unusually low starting current. They are available in drip proof and splash proof enclosures.

PerformanceRated© Motors ⅛ to 400 H. P.

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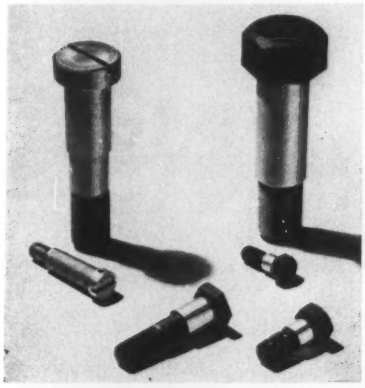
CE-32

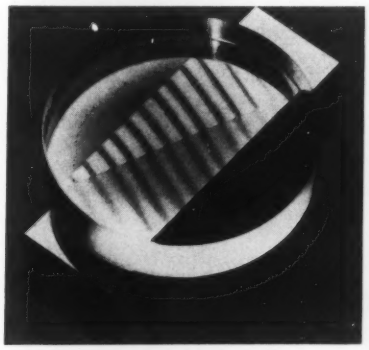
NEW PRODUCTS and equipment



links and in other assemblies requiring a close-tolerance bearing surface and high shear strength. *Write*: Cleveland Cap Screw Co., 4444 Lee Rd., Cleveland, O. *Phone*: Ludlow 1-3000

Optical Flats

Micro-Koted flats are fused quartz coated with a hard, transparent metallic material. The flat illustrated is coated on the upper left side. The lower right side is untreated.



Advantages claimed for the coated flat include accuracy, improved contrast, longer life and improved readability. Width of a dark fringe on the flat is about 0.000001 in. *Write*: Van Keuren Co., 176 Waltham St., Watertown, Mass. *Phone*: Watertown 4-4394

Power Presses

Straightening, assembling and cold riveting are done by this series of desk-type production presses. Models use 80 lb of air pressure or can be equipped with low pressure, hydraulic pump units. Capacities: 10 and 20 tons.

Parts to be straightened are held in centers or rollers while constant reading underside indicators show the amount of distortion and deflection. Pressure is applied where needed through a single head on a rolling carriage or through multiple heads adjusted longitudinally.

On multiple head models there is no movement of carriage or part. *Write*: General Mfg. Co., 6430 Farnsworth, Detroit 11, Mich. *Phone*: Walnut 1-0190

Filter for Liquids

This self-cleaning filter operates under pressure. It automatically filters emulsions and oils at rates of 10 to 3000 gallons a minute.

The unit is for grinding and machining operations and industrial washer filtration where dirt content is high and a fine degree of filtration is needed.

The filter has a stationary and a movable compartment. Between the compartments is a gasket seal and an endless nylon mesh belt

WHERE ELSE
can you get a BETTER DISH?

In WESTern PENNsylvania, we can offer you a new or existing plant on this very favorable 3-point basis:

1. *100% Financing* — through a unique combination of community, state, commercial financing now available.
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3. *Custom-Built Plants* — built to your specifications by co-operative Community Industrial Development Corporations.

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Area Development Department
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S-4

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Company _____
Address _____
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WEST PENN POWER
an operating unit of the WEST PENN ELECTRIC SYSTEM

"You sure this Chlorothene solvent is safe, Chet?"

"Sure, Jess, it's as safe as they make 'em. Of course you don't drink Chlorothene® or swim in it. You use good common sense in handling any solvent."

"Tell me more. Will it catch fire?"

"No, unlike petroleum solvents, it has no flash or fire point. We use a lot of Chlorothene for cold cleaning, wiping and dipping because it's the safest solvent we can buy."

"Is the toxic hazard from breathing vapors very high?"

"It's one of the safest. Has an M.A.C. rating of 500 ppm. In fact, our Safety Engineer recommended it."

"Guess that takes care of the safety angle."

"Yes, and Chlorothene really takes care of the cleaning angle, too. It's high in solvent power and evaporates fast."

"Say, Chet, did you invent this stuff?"

"Nope. Dow developed it."

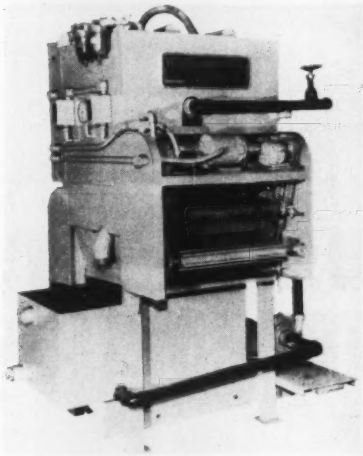
"Who?"

"Dow. The Dow Chemical Company, Midland, Michigan. You know, the company that makes the complete line of chlorinated solvents—Dow Trichloroethylene and Dow Perchloroethylene Industrial for vapor degreasing, and Dow Methylene Chloride for stripping and cleaning metals. Why don't you write them for the whole story?"

YOU CAN DEPEND ON DOW

which carries the filter medium.

Operation cycle: Liquid is pumped to the top compartment and forced through the filter medium (paper, cloth, felt or glass fiber) under pressure and is discharged from the bottom compartment. The two compartments are held together by an air cylinder.



As dirt or sludge builds up on the filter medium, the internal pressure rises. At a set pressure, the unit separates the compartments, moves the belt, closes the compartments and resumes operation. *Write*: Hydromation Engineering Co., 19661 Schoolcraft, Detroit 23, Mich. *Phone*: Vermont 8-0492

Optical Measuring

Co-ordinate cathetometers make horizontal and vertical measurements in a vertical plane at one setting. The object being measured does not have to be rotated. This reduces inspection time.

Uses include measuring jet engine sections, complicated castings, printed circuits, bolt holes and bosses on large parts and traces on cathode ray tubes.

Co-ordinate ranges from 2 x 2 in. up to 24 x 42 in. are available in English or metric systems.

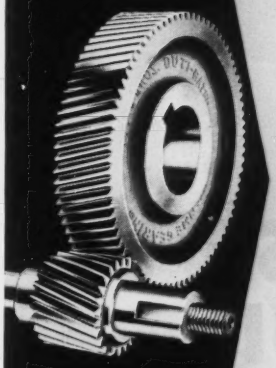
The instrument has a microscope (or telemicroscope) mounted on a carriage which is moved up and down on a vertical bar. This assembly is moved on accurate hori-

(*Please turn to page* 148)

PREMIUM GEARING
at Production-Run Prices

Foote Bros. Offers Engineered Helical and Worm Gear Sets FROM STOCK

1638 Duti-Rated COMBINATIONS



IN STOCK:

*Horsepower Ratings....1 to 200**
*Center Distances.....2" to 12"**

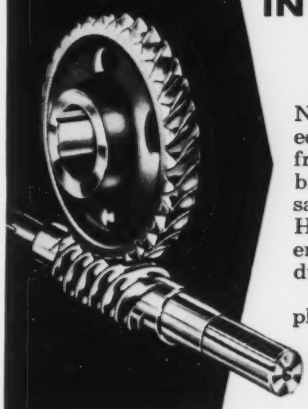
Check with Foote Bros. *before* you finalize that design. The chances are you'll find exactly what you need among the 1638 *stock* combinations of Duti-Rated Helical Gears.

When you buy Duti-Rated Gearing, you'll get more than best for your money . . . you'll get the benefit of thousands of engineering and development hours . . . and the unquestioned advantages of precision tooling and manufacturing methods. You'll get performance proven in countless Foote Bros. Line-O-Power and special drives, and Foote Bros. —Louis Allis Gearmotors. This is high hardness, accurate, balanced design gearing that will give you more load capacity and wear life per dollar.

**Larger sizes made to order from standard tooling.*

Write for DUTI-RATED catalog: Engineering Manual DR No. 2.

150 WORM GEAR COMBINATIONS



IN STOCK:

Horsepower Ratings....1 to 100†
Center Distances.....2" to 12"†

Need worm gear and worm sets? There is economy and convenience in choosing them from the many Foote Bros. worm gear combinations available from stock. This is the same gearing used in famous Foote Bros. HYGRADE Enclosed Worm Gear Drives . . . engineered, premium quality gearing at production-run prices.

Engineering Manual SW No. 1 has complete details. Write for your copy.

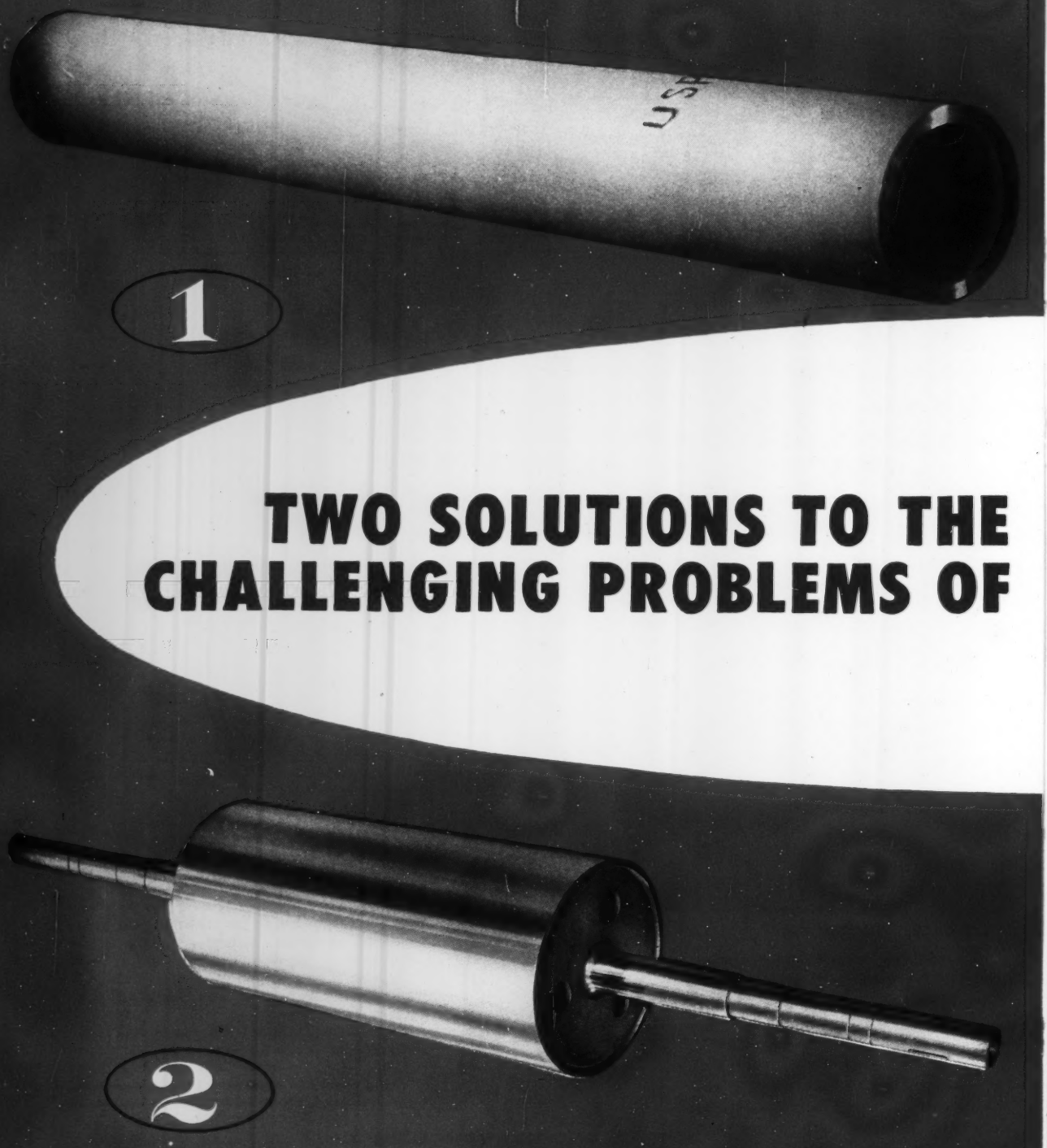
† Tooling available for larger worm gear sets, engineered, but not stocked, to 200 HP and 18" centers. Prompt deliveries.

ENGINEERING SERVICE

Let us help you select standard helical or worm gearing to meet your special requirements, or, let us design and build your complete unit. Place your gear problems in the hands of experienced power transmission and gear engineers. Your inquiry is invited, and there's no obligation.

this trademark stands for the finest industrial gearing made

FOOTE BROS.
Better Power Transmission Through Better Gears
FOOTE BROS. GEAR AND MACHINE CORPORATION
4583 South Western Boulevard, Chicago 9, Illinois



TWO SOLUTIONS TO THE CHALLENGING PROBLEMS OF

UNITED STATES PIPE & FOUNDRY CO.

Steel and Tubes Division

STEEL & TUBES U.S. PIPE DIVISION

BURLINGTON, NEW JERSEY

SALES OFFICES: LOS ANGELES, SAN FRANCISCO, CHICAGO, ST. LOUIS, COLUMBUS, DETROIT, PITTSBURGH, HARTFORD, BURLINGTON

HIGH TEMPERATURE

SOUNDNESS AT 2150° F.

1 Because of their inherent soundness, metal mold centrifugally cast retorts give longer operating life at extreme temperatures. These retorts have been tested in service under the most adverse operating conditions, and field performance data prove their superiority conclusively.

Centrifugally cast stainless steel retorts are used by the New England Lime Company of Canaan, Connecticut to produce high purity magnesium metal by thermal reduction. Their retorts are operated 24 hours a day at 2150° F. under a high internal vacuum — a test only the ultimate in soundness and quality could survive.

SURFACE AT 1400° F.

2 The Selas Corporation of America, one of the nation's leading industrial furnace builders, demands a high order of quality in the stainless steel rolls used in their continuous strip annealing furnaces. Perfect roll surfaces are a "must". The slightest surface imperfection in the strip will cause rejection.

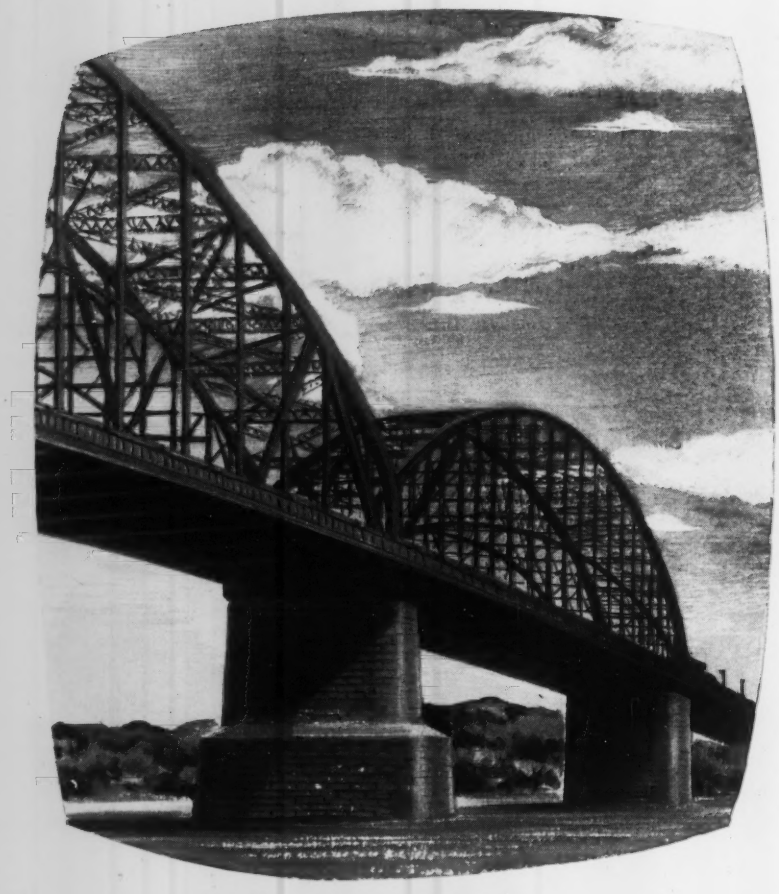
Long, trouble-free life, at extreme temperatures, is assured because of the dense, flawless roll surface made possible by the metal mold centrifugal process.

In cylindrically shaped sections, U. S. Pipe offers a wide range of sizes in electric furnace alloys for many difficult and exacting applications.

"METAL MOLD" CENTRIFUGAL CASTINGS

SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter	5" to 50"
Wall Thickness	⅜" and up
Length	Up to 16'
Type of Stainless Cast	All Standard AISI and ACI grades of ferritic and austenitic stainless plus "Special" types



ONLY STEEL . . .

can provide the basic structural strength to withstand the tremendous stresses, strains, and loads of a modern "bay-spanning" bridge!

ONLY STEEL . . .

can do the job where the prerequisite quality in an abrasive calls for steel's hardness, toughness, and strength.

"TRU-STEEL" Is TRUE STEEL

The original high carbon, fully heat-treated steel shot of tool steel quality. TRU-STEEL is solid, hard, and tough — TRUE STEEL in Chemistry, Characteristics and Performance.

NOW IN 50 POUND BAGS

Write for full information on TRU-STEEL and what it can do for YOU in YOUR cleaning operation!

TRU-STEEL SHOT

STEEL SHOT PRODUCERS, INC.®
Butler, Pa.
Subsidiary of Pittsburgh Crushed Steel Co.
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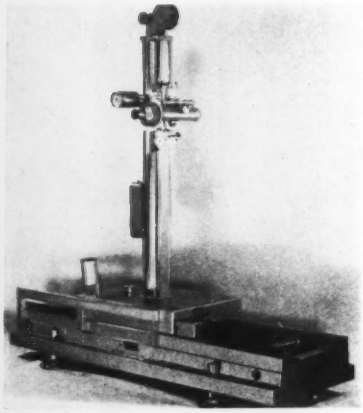
Sold by Pangborn Corporation, and by leading distributors of foundry supplies from coast to coast

NEW PRODUCTS and equipment

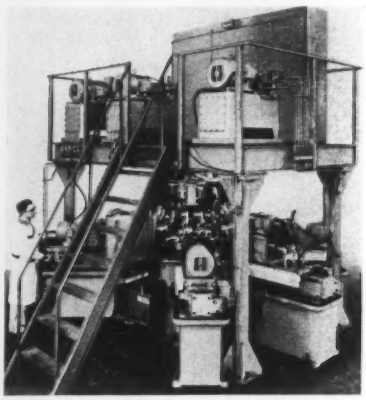


zontal ways. Fine motion adjustment is provided by micrometer screws. *Write*: Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Ill. *Phone*: Buckingham 1-5335

Indexing Machine

This eight-station machine spot faces, reams and bores the sintered iron bore and thrust face of 700 water pump impellers an hour.

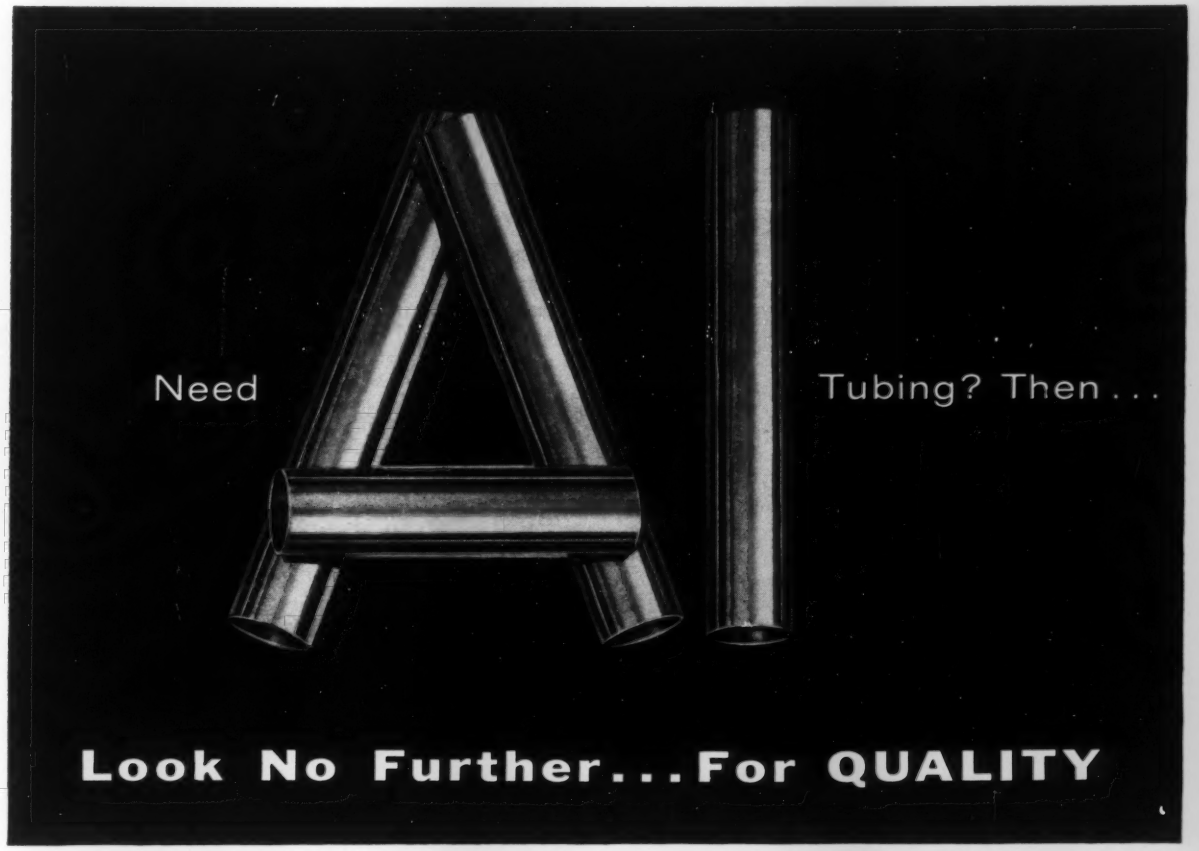
By changing fixtures and heads, the machine can be adapted to a variety of large and small parts.



Parts are automatically centered, squared and held by two over-center clamping fixtures at each station.

Machining heads are mounted on way units that have advance and return rates of 300 ipm and thrusts of 7000 lb.

The index table can be moved from station to station in 1¾ sec-



Because *BISHOP* small diameter tubing is not excelled in accuracy of I.D. and O.D. . . . in dimensional precision . . . in tolerances . . . in finish.

Whether it be for a precision part in an instrument . . . a heat exchanger in today's high speed aircraft . . . a thermocouple . . . an electronic or atomic application.

Wherever tubing is needed to meet corrosion, heat, shock, stress, psi pressure resistance and vibration . . . for highest quality and performance *specify* BISHOP tubing, at comparable prices.

Catalogs on Request. For Prompt Service, Fast Deliveries Call Malvern, Pa. 3100

SEAMLESS AND WELDED AND DRAWN STAINLESS STEEL TUBING

Mechanical, Capillary, Hypodermic and Aircraft Grade

(.008" to 1.000" O.D.—.003" to .083" Wall)

NICKEL AND NICKEL ALLOY TUBING

(up to .625" O.D.)

TUBULAR FABRICATED PARTS

Flanged, Flared, Milled, Slotted, Swaged and Threaded

GLASS-TO-METAL SEALING ALLOYS

CLAD METALS & COMPOSITE WIRES

JB

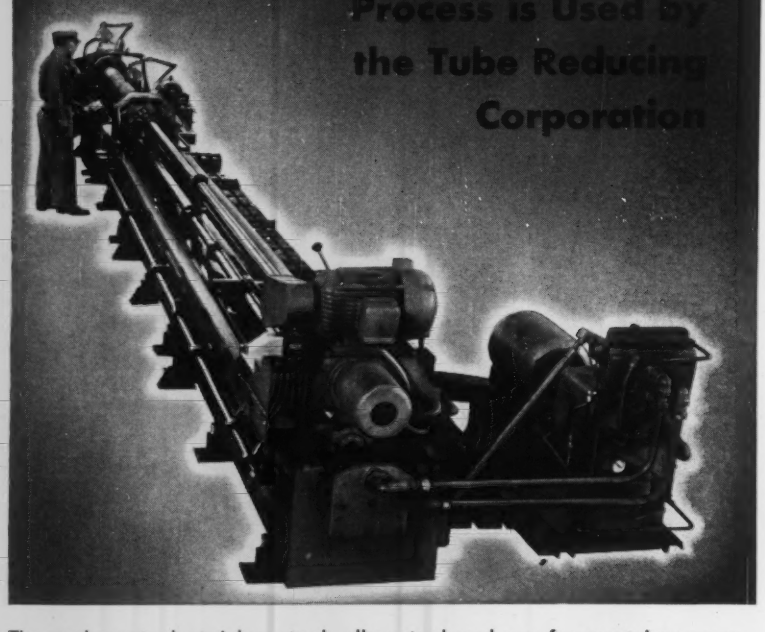
STAINLESS STEEL PRODUCTS DIVISION

J. BISHOP & CO. Platinum Works

Malvern, Pennsylvania

Why MICROHONING

Process is Used by the Tube Reducing Corporation



The carbon steel, stainless steel, alloy steel and non-ferrous tubes manufactured by the Tube Reducing Corporation are used on applications that require high strength, uniform wall thickness and surfaces free of pits, scratches or other imperfections.

In processing its tubes, Tube Reducing uses Microhoning, either to prepare the tubing for its exclusive "Rockrite" process, or to generate functional characteristics in finished tubing.

As a preparatory operation—which produces a round, straight bore and a clean-cut, cross-hatch surface pattern—Microhoning helps to improve the results of "Rockriting." The Microhoned surface slides easily over the "rocking" mandrel and compresses to a smooth, flaw-free surface that passes the most rigid inspection and tests.

Other "Rockrite" tubes, used in such applications as hydraulic cylinders, are Microhoned after "rocking" to generate final bore size and geometric accuracy.

The principles and application of Microhoning are explained in a 30-minute, 16mm, sound movie, "Progress in Precision"... available at your request.

☐ Please send me "Progress in Precision" in time for showing on _____(date).
☐ Please have a Micromatic Field Engineer call.
☐ Please send Microhoning literature and case histories.

NAME _____F
TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE _____ STATE _____

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

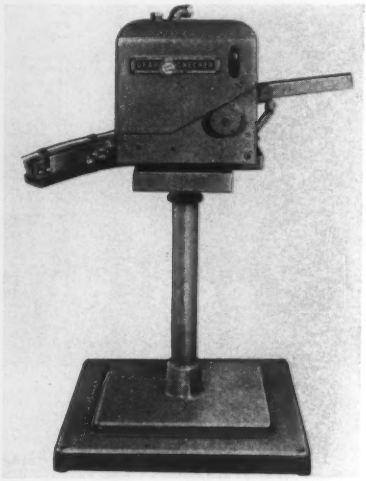
NEW PRODUCTS and equipment

onds without shock or impact. *Write*: Expert Automation Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich. *Phone*: Twinbrook 1-4327

Gear Gaging

Size and helix angles of spur or helical gears are checked by this unit.

Gears are fed singly. Those passing inspection travel through the machine into an inclined exit chute.



After a predetermined number of rejects, the unit shuts down the gear production machine. *Write*: National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone*: Walnut 1-8980

Press Saves Time

Die change time is reduced to as little as five minutes by this press, designed with sliding bolsters and preset dies.

When a production run ends, the die is removed on one of the sliding bolsters. A new die, set up on the second sliding bolster during the previous run, slides into the press for a new run. Only an overhead crane is needed to make the change.

The press design can be applied to all sizes and types of presses. *Write*: Hamilton Division, Baldwin-Lima-Hamilton Corp., Hamilton, O. *Phone*: Twinbrook 4-5611

NEW literature

Write directly to the company for a copy

Automatic Filters

Coolants, lubricating oils and similar liquids can be filtered with the unit described in this 4-page bulletin. Lubrication & Filtration Division, Bowser Inc., 1300 E. Creighton Ave., Ft. Wayne, Ind.

Iron Powders

This 14-page bulletin lists properties and design hints for iron powders. Advertising Division, Republic Steel Corp., 3100 E. 45th St., Cleveland 27, O.

Coolant Pumps

Bulletin 7444, 4 pages, describes circulating and coolant pumps for sidewall or immersion mounting. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Overhead Conveyors

Free trolleys used with an overhead power system are described in this 16-page booklet. Jervis B. Webb Co., 8955 Alpine Ave., Detroit 4, Mich.

Deep Hole Drilling

Gun drilling of difficult materials and unsymmetrical workpieces is described in this 4-page bulletin. Deep Hole Specialists Inc., 56 River St., Chagrin Falls, O.

Portable Conveyor

A belt conveyor with an incline adjustable to 30 degrees is covered in bulletin 50AA, 4 pages. E. W. Buschman Co., Clifton and Spring Grove avenues, Cincinnati 32, O.

Basic Refractory

Bulletin S-3, 4 pages, describes the properties of a magnesia-chrome refractory. Cohart Refractories Co., 1600 W. Lee St., Louisville 10, Ky.

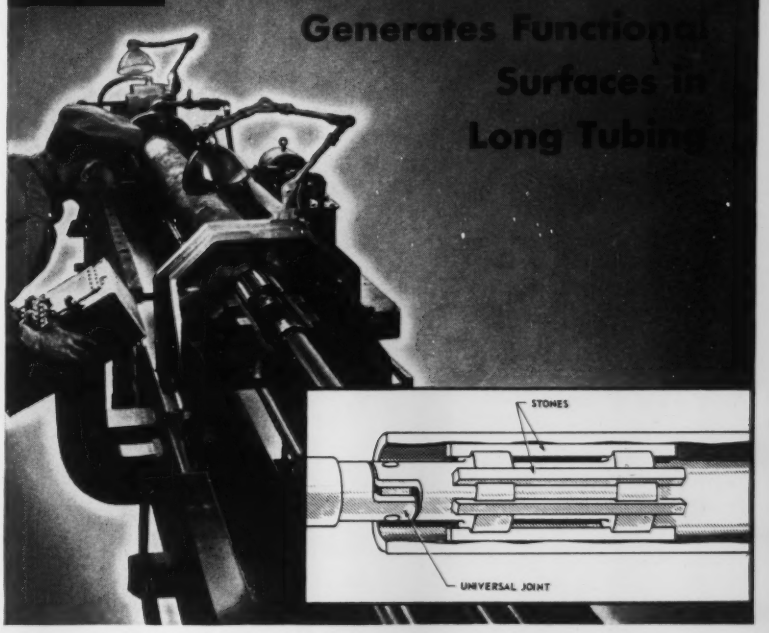
Broaching Tools

This 24-page booklet tells how to handle broaches when they are in use on the machine, when they are being resharpened and when they are being moved through the shop. Lapointe Machine Tool Co., Hudson, Mass.

Leaded Steels

This 16-page bulletin describes characteristics, mechanical properties and workability of leaded steels and case histories of their use. Steel Division, Copperweld Steel Co., Warren, O.

How MICROHONING Generates Functional Surfaces in Long Tubing



Microhoning is used by the Tube Reducing Corporation in processing many types of tubing that range up to 18 feet long and 9½ inches in diameter. The tubes are Microhoned on a horizontal Hydrohoner equipped with a hydraulic clamping fixture that is easily adjusted to handle tubes of various sizes.

Microhoning tools have long abrasive sticks which cannot follow irregularities in the bore. The abrasive action removes high spots while generating required surface characteristics and accurate geometry. A universal joint, connecting the tool body to the drive shaft, eliminates any tendency of abrasive action to change the bore location.

Typical processing of "Rockrite" tubes: To remove scale and deep scratches . . . hot rolled, pierced billets are first bored. Then, the bores are Microhoned—stock removal rate is .015 inch from a 4½-inch diameter x 128-inch length in less than 30 minutes. The Microhoning operation generates accurate, round, straight surfaces with the required finishes of 20 to 30 microinches r. m. s.

Send coupon for complete information.

Learn how Microhoning will give efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

☐ Please have a Micromatic Field Engineer call.
☐ Please send Micromatic literature and case histories.

NAME_____F

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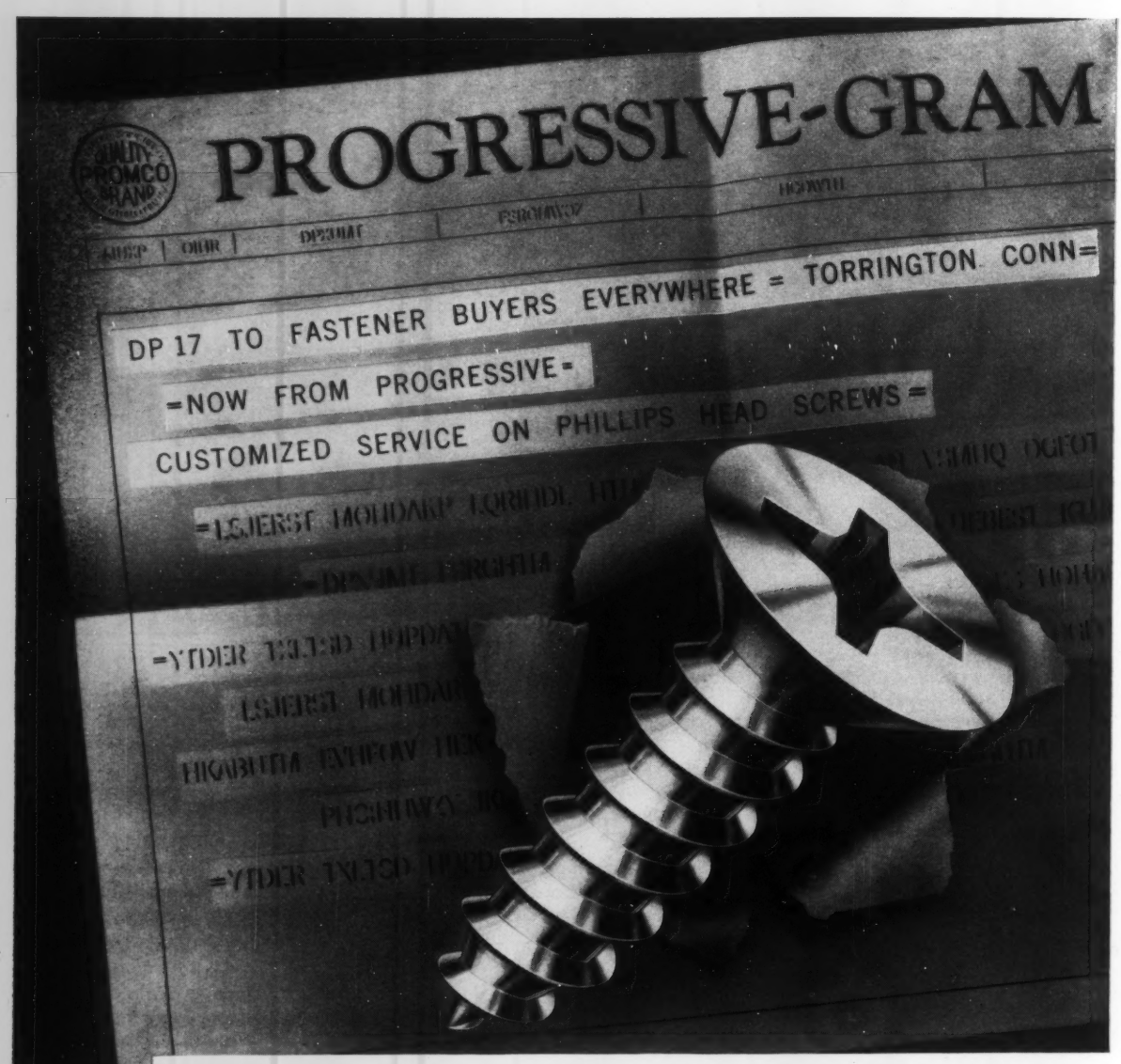
MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN


PROGRESSIVE-GRAM
DP 17 TO FASTENER BUYERS EVERYWHERE = TORRINGTON CONN=
=NOW FROM PROGRESSIVE=
CUSTOMIZED SERVICE ON PHILLIPS HEAD SCREWS=

Now you can get from PROGRESSIVE Phillips Head Screws with an extra customized touch — Phillips Head Screws which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; *plus* (3) the double economy of low initial cost *and* the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

STANDARDS AND SPECIALS CUSTOMIZED FOR YOUR NEEDS

THE PROGRESSIVE MFG. CO.
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76 Norwood Street, Torrington, Connecticut

Market Outlook

SCRAP PRICES continue to express confidence in a strong rate of steel production. In the week ended June 12, their rise pushed STEEL's scrap price composite $3.34 a gross ton over the preceding week's figure. This marked the seventh consecutive week of increase from this year's low mark of $42.50. The composite now is $55.67 a ton.

A FAVORITE—Many look upon scrap as a barometer of steel production. (It is an important raw material in steelmaking.) For instance, scrap prices turned downward last December—nearly three months before steel production began declining, and they turned upward at the beginning of May—a month before steel production headed upward.

CONTRASTS—The reduced rate of steel production in March, April and May has been attributed to inventory reduction. In two other periods of inventory reduction—1949 and 1954—scrap prices were far below those of today. In the week ended June 11, 1949, STEEL's scrap price composite was $21.50 a ton, and in the week ended June 16, 1954, it was $27.83.

Not only is scrap far above the 1949 and 1954 levels, it also tops the year-ago's $46.

STIMULANT—The current upward movement in scrap prices will tend to keep blast furnaces at high operating rates. Steelmakers will use as much hot metal as they can in lieu of scrap. They did this in the first four months of this year. It's a matter of economics. In the first three of these months, when scrap prices were considerably above those of the first quarter of last year, blast furnace operations averaged 99 per cent of capacity while steel production averaged 96 per cent. In contrast, the first quarter of last year saw blast furnace operations average 97.6 per cent, steel production, 99.6 per cent.

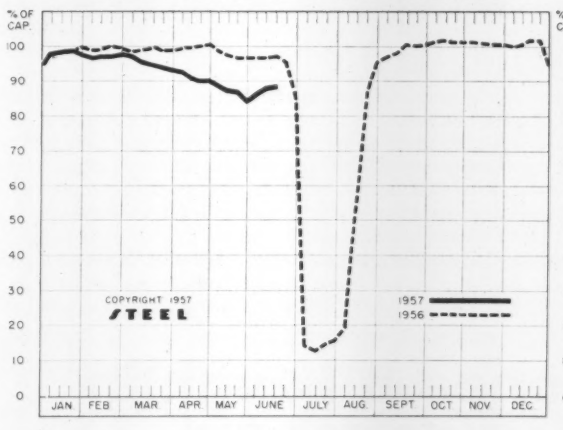
GAINING—The turn upward in steel production that started three weeks ago carried the national operating rate to 88.5 per cent of capacity in the week ended June 16. This is a gain of half a point over the preceding week and 4.5 points over the year's low mark.

TIME OUT—Approaching vacations will tend to restrict steel production, although rolling operations likely will be affected more than ingot output. Alan Wood Steel Co., Conshohocken, Pa., will suspend work in its sheet and strip department two weeks beginning June 24. It will suspend plate production only one week, beginning July 1.

PRECAUTION—Plates are one of the few steel products that remain in tight supply-demand relationship. Some of the squeeze was lifted from the plate market by strip mill plates. They were available because the mills that can produce them were not full with orders for sheets. A pickup in sheet demand could come from an acceleration of buying by the automobile industry for its 1958 models. To be ready for such an event, Wheeling Steel Corp., Wheeling, W. Va., is taking strip mill plate orders only for July and August delivery.

Oil country goods continue to be in strong demand. National Supply Co., Pittsburgh, immediately filled its third quarter order books for drill pipe, casing, tubing and machinery.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

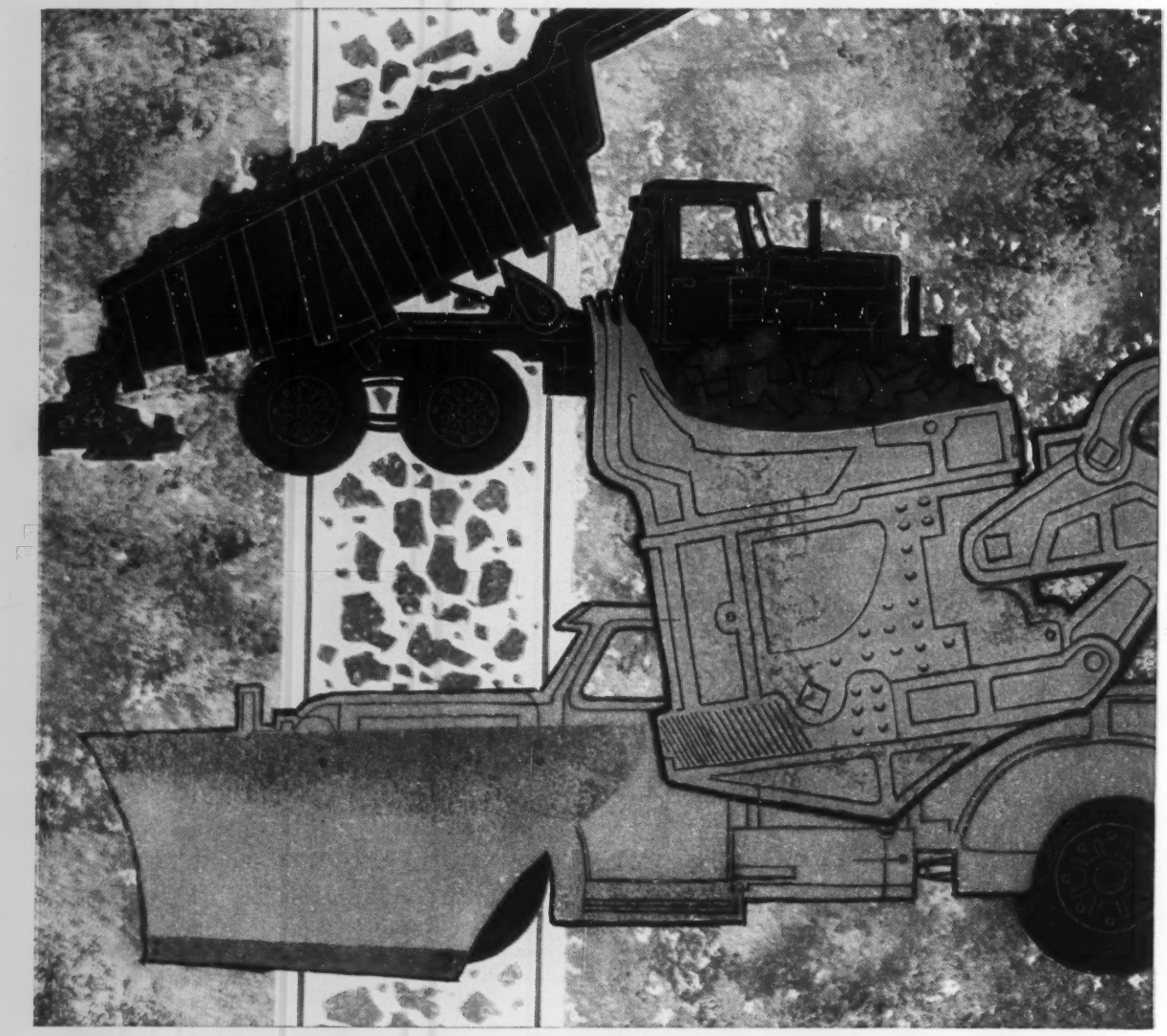
	Week Ended June 16	Change	Same Week 1956	Same Week 1955
Pittsburgh	88.5	— 1*	95.5	100
Chicago	89	— 0.5*	99	97.5
Mid-Atlantic	94.5	+ 0.5	98	95.5
Youngstown	76.5	+ 6.5	95	98
Wheeling	83.5	— 9	100.5	95.5
Cleveland	88	0*	101	100
Buffalo	102.5	+ 7.5	105	104.5
Birmingham	92.5	0	23.5	93.5
New England	57	+ 2	88	92
Cincinnati	87.5	— 5.5	92.5	87
St. Louis	84.5	— 5	103	106
Detroit	99	+ 3	95.5	93
Western	99	— 1	105	108
National Rate	88.5	+ 0.5	97	96.5

INGOT PRODUCTION‡

	Week Ended June 16	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	140.5†	139.4	134.2	143.1
NET TONS (In thousands)	2,257†	2,240	2,155	2,299

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 47 Technical Outlook—p. 103



JALLOY special alloy steel

resists impact and abrasion in toughest applications

Heat treated Jalloy steels wear as much as 20 times longer than mild steels under rigorous impact and abrasive conditions. By using Jalloy you can cut maintenance costs drastically. Increased product life reduces downtime and lowers your labor costs.

Jalloy steels are available in the forms you require (plates, hot rolled sheets, hot rolled bars, small shapes and structurals). Jalloy can be purchased in three grades to meet specific use requirements: Grade 1, where formability is important; Grade 3, capable of being heat treated to excellent physical properties for good resistance to abrasion or wear; Grade 7, where high hardness with good ductility or wear resistance is desirable.

Your local distributor can supply you with latest information on these Jalloy grades, or you can write to Jones & Laughlin Steel Corporation, Dept. 404, 3 Gateway Center, Pittsburgh 30, Pa.

J&L STEEL

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Lone Star Steel rides herd on oil country goods as . . .

Concentration Pays Off

DOWN TEXAS way, where everything is bigger or better, it's only natural to find the steel company with the highest operating rate in the country—Lone Star Steel Co., Dallas. Not only did the Texans top the roster last year with 114.5 per cent of capacity, but so far in 1957 they have racked up a 121.3 per cent average, some 30 points above the national figure.

"We've been able to accomplish this even though we have put all our eggs in one basket," says E. B. Germany, president. The oil and gas industry accounts for about 90 per cent of Lone Star's sales. "Through the years," Mr. Germany continues, "the oil industry seems to be the least affected by business recessions. This year's wells drilled are expected to top 60,000, and projects call for something like 70,000 wells annually by 1960."

Solid Business—Company officials can see no reason for their operating rate to fall during the rest of the year. In fact, during the last two months, Lone Star has entered the market for 60,000 tons of ingots to supplement its own open hearth output. "At present, we have finishing capacity in excess of our ability to furnish ingots. This 60,000 tons should hold us until we get our new fifth open hearth operating early next year," reports Mr. Germany.

In addition to the new furnace, Lone Star's $8-million expansion plan calls for completion of a stretch reducing mill late this year and a bar mill next year. The bar mill represents a step into a new market, but company officials look on it as a by-product of their main business of producing oil country tubing and pipe. In the past the company has scrapped the trim from its skelp and fed it back to its furnaces. Now it will process this trim into bars, increasing the finished product yield of its basic steel production.

Orders Aplenty—There has been some relaxation in the oil and gas industry since the reopening of the Suez canal, but it hasn't affected orders for oil country goods too much. Lone Star is booked through 1957 on casing and tubing. It is committed through 1958 on line pipe, although company officials say they can still accept some orders for small jobs.

In addition to its oil country goods, the Texas steelmaker realizes about 10 per cent of its profits from cast iron pressure pipe. High construction costs and interest rates are causing some municipalities to pull in their horns on water projects, enabling the company to accumulate its first inventory of this product in several years. However, they see no particular difficulty in the future for cast iron pipe.

Metamorphosis—The rise of the Lone Star has been swift. It was a war baby in 1942, producing pig iron, coke and chemical by-products. After purchasing the facilities from the government in 1948, the company added the foundry for cast iron pipe. In 1951, the expansion started which resulted in a fully integrated steel mill. Since then it has carved a unique niche for itself in the steel industry. Ranking 24th in capacity among the companies included in STEEL's annual financial analysis of the industry (Apr. 1, opposite page 58), Lone Star ranks first in steel operating rate and ratio of current assets to current liabilities. It's third in net profit as a per cent of sales. It's fifth in net income per ton of ingot capacity and capitalization per ton of ingot capacity. The four companies ahead of Lone Star in these last two are specialty steelmakers.

Raw materials are the least of the Texans' worries. They have their own ore reserves within 30 miles of the plant. The ore averages 15 to 20 per cent iron content and is beneficiated to 50-55 per cent iron content. At the planned rate of consumption, there is enough to last between 75 and 100 years. Lone Star has no plans to sell on the open market or enter the open market to conserve its supply.

Coal comes from company mines in Oklahoma. There is enough for another 80 years at the planned rate of depletion. Limestone comes from mines in Texas within 200 miles of the plant.

Fast Payoff—About the only problem the Texans have is their debt to the government, and they don't worry too much about that. They borrowed $87 million from Uncle Sam to start their integration program. Today, the debt is down to $56.3 million. The loan agreement places a deadline on the last payment in 1971, but at the present rate, it will be paid off long before then.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 165

Public works, including highways and schools, are increasing demand on reinforcing bar mills. Bridge requirements are heavier in New England, while schools and other public works in the area ac-

count for a substantial portion of current volume.

Highway mat reinforcement requirements are lagging as the result of delays in the federal road program — occasioned, in some cases, by revisions in planning.

Competition among bar distributors is unsettling prices for deformed bars. While no sharp weakening in the market is noted, more tonnage is being placed on a price basis, with contractors inclined to shop around for tonnage.

Steel Bars . . .

Bar Prices, Page 165

While steel bar shipments will be up a trifle this month, orders are tapering because of the anticipated drop in July requirements and the expected seasonal lull through most of August.

Hot and cold rolled and alloys are affected, though agricultural implement manufacturers have been showing a little more interest in alloys lately.

The decline in trading has been cushioned to some extent by consumer buying to round out inventories. But major users reportedly still hold large inventories, and there has been relatively little hedge buying in anticipation of a July 1 price increase.

Generally, deliveries are prompt. In the case of cold-finished (carbon and alloy), shipments are available from stock.

Producers think July will be the slowest month of the year because of mass vacations. In some cases, operation curtailments may extend beyond the normal vacation suspensions. Hot weather is likely to be a factor in holding down manufacturing demands over the next couple months.

Tool Steel . . .

Tool Steel Prices, Page 169

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 9079 net tons in April, reports the American Iron & Steel Institute. This compares with 10,132 tons in March, and 11,720 tons in April, 1956.

Cumulative shipments through April this year were 37,850 net tons, off sharply from the 44,816 tons in the like 1956 period.

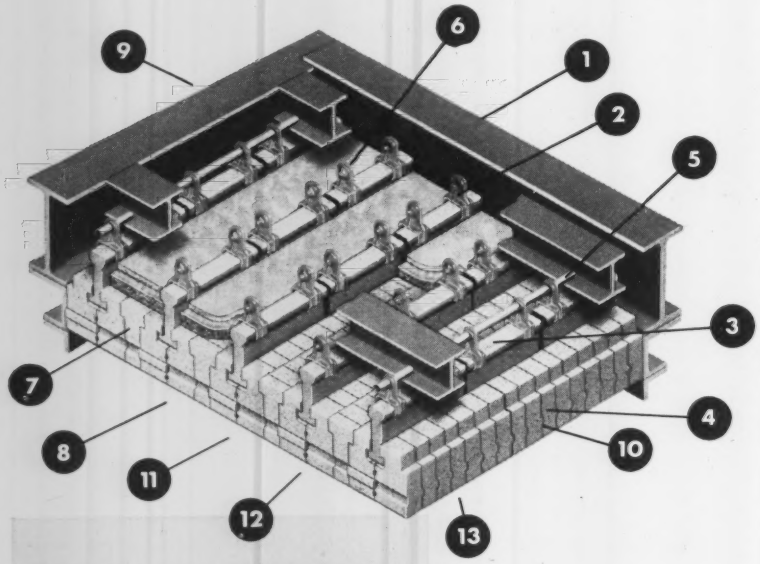
Plates . . .

Plate Prices, Page 165

Plate business continues brisk, though some easing is expected over coming weeks because of seasonal influences, such as vacations. Producers of sheared plates will have no trouble disposing of all the tonnage they can produce, and makers of light strip-plate are not having much difficulty finding an outlet for their production.

Shops fabricating sheared plates, wide and heavy stock, will take out all their third quarter tonnage. Most are said to have specifications in for August shipments. Indications are supply will continue tight through the remainder of the year, with requirements from heavy industry, including electrical machinery, maintained at a high level.

Weldment backlogs are off in New England, including machine tools. Shipyard releases will be up substantially in the last half of the year.



HOW TO STOP HEAT FROM RAISING THE ROOF

Here's the Bigelow-Liptak arch design for a soaking pit cover. It features unit-suspended construction for stability, long life and easy maintenance.* Write for complete information.

*A similar arch installed in a midwestern steel mill has been in action for seven years without shut down.

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Increased availability of strip-plate is satisfying to tank builders, but width limitations may call for more welding in fabrication.

Most sheetmakers are offering light plate tonnage and equalizing on freight. Expectations are most of them will continue to turn out plates into August by which time renewed demand for sheets is expected from the auto industry.

Several sizable construction projects requiring plates are pending in the Pacific Northwest. They include Seattle's $11-million Tolt river water supply line and a $3.5-million pipeline job for Everett, Wash.

Tin Plate . . .

Tin Plate Prices, Page 167

Tin plate sales are holding well. Mills are operating close to capacity, although there's still some space left on third quarter books.

A year ago Chicago area sales officials were commenting that any time domestic demands tapered, the South American market would take the excess tonnage. Today, needs of the Latins are just as great, but American tin plate exporters are losing some sales as the result of competition.

Tubular Goods . . .

Tubular Goods Prices, Page 169

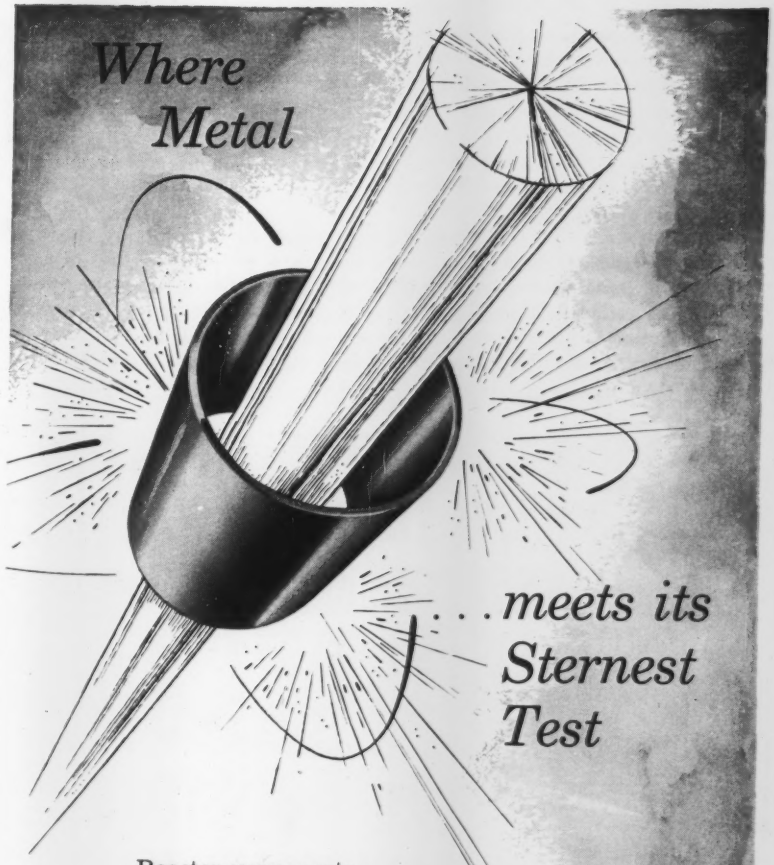
Tubular goods demand is a little more spotty than it has been. The decline in house construction is being reflected in sales of merchant pipe to the heating and plumbing trades. The seasonal pickup in demand from this area of consumption has been disappointing.

Other tubular products are in strong demand. One producer of oil country goods, including drill pipe, casing and tubing, says he already has filled third quarter order books and expects sales to hold up until fourth quarter.

Producers of line pipe have stepped up production with the improvement in plate availability this quarter.

The cast iron pipe market continues active. Sales agencies in the Pacific Northwest report area sales in the first six months will reach a satisfactory total and expect those in the last half to be as good.

Sawhill Tubular Products Inc.,



Reactor components, operating submerged in high-temperature and high-pressure radioactive water, are sealed in protective "cans" of *stainless steel.* Pile control rods, exposed to the same conditions, are clad with sleeves of *stainless steel* and are suspended by cables of *stainless steel.*

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COLD ROLLED STRIP: *Super Metals, Stainless, Alloy*
WELDED TUBES AND PIPE: *Super Metals, Stainless*

Sharon, Pa., is constructing a plant which will manufacture rigid steel electrical conduit. It will use a substantial portion of the output of Sawhill's high-speed continuous weld pipe mill, says R. F. Eisenbies, president. The product will be distributed through Steelduct Co., Youngstown.

Reflecting the latest decline in the price of zinc, the U.S. Steel Export Co. reduced export price bases on American standard butt-weld and seamless pipe, effective June 6. Prices quoted include freight from producing mills. The changes are in line with those in the domestic market.

Wire . . .

Wire Prices, Pages 167 & 168

June order bookings by the wire mills are reportedly the highest for any month so far this year, but they are not heavy enough to necessitate an increase in basic steel operations at the wire mills, estimated at 60-65 per cent of capacity.

Buying in anticipation of price increases July 1 provides the major reason for the moderate bulge in orders. These tonnages are at the expense of July-August releases in some cases. New ordering stresses prompt shipments, and, to some extent, confirms reports of depleted consumer stocks. Some automotive tonnage is coming through ahead of expectations.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 166 & 167

Steel pail shipments in March amounted to 6,173,037 units, 13 per cent above the 5,484,224 shipped in February, but down 9 per cent from the 6,794,802 shipped in March last year. A decline also was reported in the first quarter total, 17,687,467 units, against 18,991,282 in the like period last year.

Shipments of steel barrels and drums in March totaled 3,012,779 units, compared with 2,849,906 in February, and 3,182,830 in March a year ago, reports the U.S. Bureau of the Census. In the first quarter, shipments were 8,934,366 units against 9,224,470 in the like period of 1956.

With sheetmakers unable to accept additional June delivery tonnage (because of the limited lead time remaining), and the summer vacation season close at hand, new sheet buying is easing. As a result, some seasonal letup in production is in prospect.

Suspensions for vacations will affect operating schedules through July and August, but most down time on this score will come in July. Most steel mills will stagger production schedules. But some will suspend for a week or two. For example, Alan Wood Steel Co., Conshohocken, Pa., will suspend sheet and strip production for two weeks, beginning June 24, and plate production for one week, beginning July 1.

Relatively little hedge buying was done to beat the expected July 1 price hike. Consumers in many cases found financing of extra-tonnage purchases too costly. Further, they lacked adequate storage space in view of substantial inventories. Over-all stocks held

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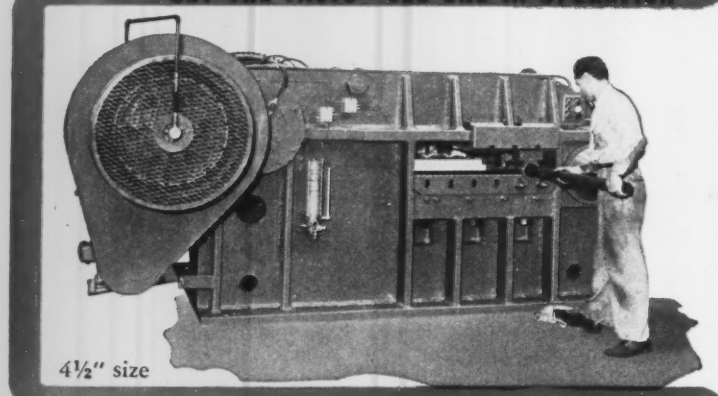

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- Made in 3", 4½", 6½" sizes and larger. Choice of hand, semi-automatic or fully automatic feed.

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by consumers are said to be relatively large, though some manufacturers (in New England, for example) are said to have worked off inventories to the point additional steel will be required quickly to care for even a mild pickup in demand for finished goods.

July will be dull, on the whole, though some consumers of sheets currently note a little strengthening in demand for their products, including stampings. This, coupled with slightly increased automotive releases over the summer, points to stepped up buying of both carbon sheets and strip by August.

For the most part, since prompt shipment sheet tonnage is available, expectations are that buyers will coast for a time, covering only current needs. Meantime, the sheetmakers are shipping as much strip plate as possible before July 1. Most of this volume was ordered with the understanding it would be delivered this month. The expectations are that the strip mills will continue rolling plate into August.

Pressure for electrical sheets is easier, mainly because of slow appliance sales. Demand for galvanized sheets continues disappointing, reflecting sluggishness in the agricultural areas, and the slide in residence construction.

Warehouse . . .

Warehouse Prices, Page 170

Warehouse business is steady. Some distributors believe it may run a shade higher this month than in May. While a few firms are increasing orders to accumulate tonnage before the expected advance in prices goes into effect, this practice is far from widespread. Another factor sustaining the sales volume is buying for maintenance and repairs by consumers who will be suspending operations soon for vacations.

Most users can obtain most of their requirements from mills, buying only spot tonnages from warehouses.

Some distributors in the Pittsburgh district report a sharp drop in orders for some items. Demand for bars and tool steel dropped 50 per cent in the past week, one supplier states. Another firm expects sheet and tin plate sales to drop off noticeably during July.

Most distributors expect the market to tighten in the fourth quarter.

Pig Iron . . .

Pig Iron Prices, Page 170

With the approach of July 1, speculation concerning pig iron prices is growing.

The consensus is that an advance of possibly $1.50 or $2 a ton to meet increased labor costs will be made some this summer. When is another question. Some observers think it may be delayed beyond early July when steel prices are expected to go up. Current slack demand, coupled with the fact prices were upped $2 a ton only last March, are seen as working against an increase at midyear.

In any case, consumers are doing little buying in anticipation of higher prices. With the vacation season at hand, they are not disposed to build stocks. A still

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slower tonnage movement is likely over coming weeks.

Indications are that furnace operations will decline the next month or so, with producers taking advantage of the lull to make equipment repairs.

Iron Ore . . .

Iron Ore Prices, Page 171

To reflect geographical shifts in the sources of iron ore of its member companies, the name of the Lake Superior Iron Ore Association was changed to the American Iron Ore Association last week. For many years the bulk of the ore supplied U.S. furnaces came from the Lake Superior region. Today, the U.S. and Canada are involved.

Shipments of lake iron ore totaled 3,062,342 gross tons in the week ended June 10, reports the Lake Superior Iron Ore Association. This compares with shipments of 2,981,287 tons in the like week of 1956.

Cumulative shipments in 1957 to June 10 were 21,062,228 tons, down 1,198,793 tons from the 22,261,021 tons moved in the like period of 1956.

Shipments of Lake Superior iron ore in May totaled 12,727,659 gross tons, topping the May, 1956, movement by 173,802 tons.

Structural Shapes . . .

Structural Shape Prices, Page 165

Structural fabricators are under less pressure for shipments. Commercial and industrial building inquiry is off. Substantial office building and miscellaneous work on architects' boards is developing slowly.

There is considerable new work before the market, such as bridges and public projects. Most fabricating shops also hold good backlogs, though they are not as extended as they were.

That situation and easier steel supply (notably standard structurals), are making for increasing competition.

Fabricated steel prices are tending downward in the New York area, the largest structural market. But higher steel prices are expected next quarter. They should bolster fabricated prices soon. But up to now, the anticipated increase has not been reflected in fabricators' estimates. This is surprising. In addition to material costs, their labor costs are expected to rise.

Work has started on U.S. Steel's newest combination blooming and structural mill at its South Chicago, Ill., plant. The high speed mill is scheduled for initial operations in the second quarter of 1958. It will be capable of producing over 1 million tons annually.

April Steel Shipments Down

Steel mill product shipments totaled 7,349,752 net tons in April, reports the American Iron & Steel Institute: Comparisons: 7,821,616 tons in March and 7,783,873 in April, 1956.

Monthly record shipments were chalked up for steel piling (56,459 tons); line pipe (381,280 tons); and tin mill products (874,548 tons).

Sheet and strip shipments at 2,070,489 net tons, comprised the

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7672-SR

Steel Product Shipments—April, 1957

(All grades; net tons)

Products	Carbon	Alloy	Stainless	Total Through April 1957	1956
Ingots	19,611	19,004	3,133	171,612	294,023
Blooms, slabs, etc.	168,025	42,287	2,851	901,092	898,564
Tube rounds	7,367	28	.....	33,129	1,726
Skelp	12,812	.....	.....	69,583	62,138
Wire rods	80,958	1,524	472	355,001	406,792
Structural shapes	566,023	8,332	11	2,251,616	1,846,961
Steel piling	56,459	.....	.....	202,189	133,873
Plates	819,515	52,492	3,596	3,297,082	2,710,873
Rails (standard)	125,632	.....	.....	483,552	464,918
Rails (all other)	10,427	.....	.....	33,413	40,382
Joint bars	10,122	.....	.....	33,084	37,025
Tie plates	26,603	.....	.....	112,904	130,154
Track spikes	7,449	.....	.....	28,597	40,563
Wheels	33,086	65	.....	131,037	121,895
Axles	18,181	.....	.....	71,755	60,400
Bars—hot rolled	559,225	122,600	5,271	2,963,186	3,305,052
Bars—reinforcing	216,492	.....	.....	913,602	801,843
Bars—cold finished	93,125	19,100	5,338	516,823	694,210
Tool steel	1,062	8,017	.....	37,850	44,816
Standard pipe	225,435	31	.....	996,820	1,008,303
Oil country goods	218,816	38,836	.....	1,066,308	957,632
Line pipe	381,278	2	.....	1,417,412	1,165,117
Mechanical tubing	49,632	19,755	410	308,883	363,166
Pressure tubing	30,176	7,972	2,139	160,156	123,403
Wire—drawn	217,438	3,932	2,587	919,755	1,112,577
Nails & Staples	40,411	.....	.....	158,368	204,036
Barbed wire	7,568	.....	.....	27,422	36,809
Woven fence	28,102	.....	.....	95,127	117,230
Bale ties	3,900	.....	.....	16,474	17,196
Black plate	79,921	.....	.....	283,651	322,996
Tin plate—HD	130,037	.....	.....	394,844	410,723
Tin plate—electrolytic	664,590	.....	.....	2,182,927	1,959,560
Sheets—hot rolled	651,418	24,906	3,240	3,009,904	3,294,689
Sheets—cold rolled	889,275	3,578	14,328	4,248,281	5,099,116
Sheets—galvanized	198,553	32	.....	846,365	1,100,382
Sheets—other coated	15,926	.....	.....	71,121	91,138
Elec. sheets & strip	8,337	50,283	.....	242,340	300,363
Strip—hot rolled	112,568	2,320	561	543,436	686,686
Strip—cold rolled	79,346	1,498	14,320	432,696	623,875
Total (1957)	6,864,901	426,594	58,257	30,029,397	31,091,205
Total (1956)	7,206,375	519,368	58,130	.....	.....

Data from the American Iron & Steel Institute.

largest product group shipped in the month, accounting for 28.2 per cent of the total movement. Bars and tool steels (1,030,230 tons) ranked second and were equal to 14 per cent of the over-all tonnage shipped.

Market groups that received more steel than in any preceding month during April were: Oil and gas industry construction, including maintenance (304,400 tons); and cans and closures (730,385 net tons).

Warehouses and distributors received 19.4 per cent of total domestic shipments in the month (1,346,485 net tons) to rank as the largest category. Construction (including maintenance) took 1,110,812 tons, 16.1 per cent, to rank second. The automotive take was 1,060,918 tons, 15.3 per cent of the total movement, ranking third.

Total shipments in the first four months this year were 30,029,397 tons. This compares with 31,091,205 tons in the like period of 1956.

Steel Output Slips in May

Steel ingot production totaled 9,808,000 net tons in May, reports the American Iron & Steel Institute. The figure was only 6780 tons below April's output of 9,814,780 tons. In May, 1956, production was 10,490,376 tons.

Output in the first five months of this year was 51,207,833 tons, compared with 52,886,175 tons in the like period last year.

The index of raw steel production (1947 - 1948 - 1949 average equals 100) was 137.9 in May, against 142.6 in April and 147.5 in May a year ago. The average for the first five months this year was 147.8.

During May, steelmaking furnaces operated at an average of 86.5 per cent of capacity, against 89.5 per cent in April. The average for the first five months was 92.7 per cent.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

9000 tons, grandstand, Aqueduct race track, New York Racing Association, Ozone Park, Long Island, N. Y., to American Bridge Division, U.S. Steel Corp.; Pittsburgh; Stone & Webster Engineering Corp., Boston, engineer-contractor.

3000 tons, power plant, Duquesne Light Co., Pittsburgh, to American Bridge Division, U.S. Steel Corp., Pittsburgh; Stone & Web-

(*Please turn to page* 172)

Imported Steel

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (⅜" Dia. incl. all extras)	$7.13	$7.36	$7.02	$6.76
Merchant Bars (¼" Round incl. all extras)	7.67	7.90	7.53	7.27
Bands (1"x⅛"x20' incl. all extras)	7.81	8.03	7.70	7.43
Angles (2"x2"x¼" incl. all extras)	6.77	7.00	7.21	6.93
Beams & Channels (base)	7.17	7.41	7.67	7.45
Furring Channels (C.R. ¾", per 1000')	26.62	27.77	32.77	31.80
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's, bright, low C, (11½ ga.)	7.38	7.52	8.52	8.52
Wire, galvanized, low C, (11½ ga.)	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)	7.60	7.75	8.78	8.78
Rope Wire (.045", 247,000 PSI, incl. extras)	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14G, 97 lbs. net)	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C, per 100')	8.64	9.11	...	...
Casing (5½", 15.5 J55, T & C, per 100')	194.00	199.00	...	...
Tubing (2⅞", 6.4 J55, EUE, per 100')	103.00	104.00	...	...
Forged R. Turn. Bars, C-1035 (from 10" dl.)	14.00	14.23	14.00	13.74

Ask prices on: Bulb tees, bolts and nuts, coated and specialty strip, welded wire reinforcing mesh and hardware cloth, boiler tubes, API line pipe, A-335-P11 pressure pipe.

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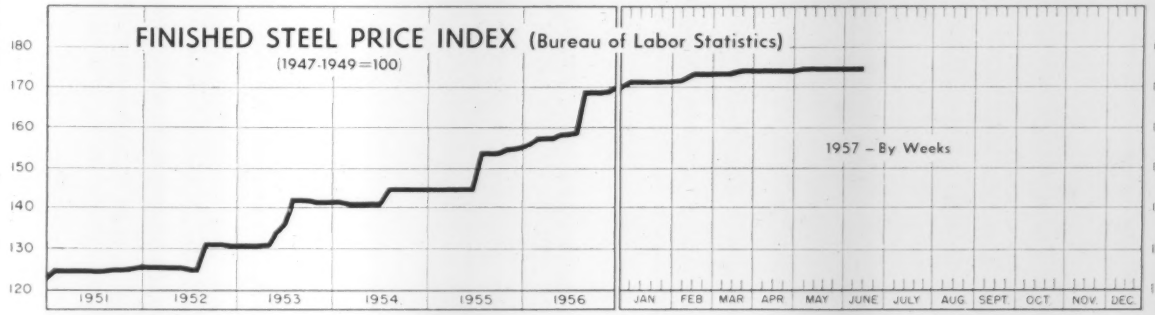
Price Indexes and Composites



June 11, 1957	Week Ago	Month Ago	May Avg.	Year Ago
174.3	174.3	174.4	174.4	158.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 11

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350	Bars, Reinforcing	5.788
Rails, Light, 40 lb	6.817	Bars, C.F., Carbon	9.910
Tie Plates	6.275	Bars, C.F., Alloy	13.425
Axles, Railway	9.400	Bars, C.F., Stainless, 302 (lb)	0.533
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.945
Plates, Carbon	5.900	Sheets, C.R., Carbon	6.789
Structural Shapes	5.667	Sheets, Galvanized	7.990
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.660
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 430 (lb)	0.475
Bars, H.R., Alloy	10.150	Strip, H.R., Carbon	6.000
Bars, H.R., Stainless, 303 (lb)	0.508	Pipe, Black, Buttweld (100 ft)	18.894
Bars, H.R., Carbon	6.075	Pipe, Galv., Buttweld (100 ft)	22.344
		Pipe, Line (100 ft)	190.108
		Casing, Oil Well, Carbon (100 ft)	185.566
		Casing, Oil Well, Alloy (100 ft)	288.980
		Tubes, Boiler (100 ft)	46.737
		Tubing, Mechanical, Carbon (100 ft)	23.713
		Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	9.775
		Wire, Drawn, Stainless, 430 (lb)	0.636
		Bale Ties (bundle)	7.423
		Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.377
		Woven Wire Fence (20-rod roll)	20.560

STEEL's FINISHED STEEL PRICE INDEX*

	June 12 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	228.59	228.59	228.59	210.45	171.92
Index in cents per lb	6.193	6.193	6.193	5.701	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$140.24	$140.24	$140.24	$128.98	$106.32
No. 2 Fdry Pig Iron, GT	64.70	64.70	64.70	60.27	52.54
Basic Pig Iron, GT	64.23	64.23	64.23	59.80	52.16
Malleable Pig Iron, GT	65.77	65.77	65.77	61.27	53.27
Steelmaking Scrap, GT	55.67	52.33	45.00	46.00	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	June 12 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.365	5.365	5.365	4.93	4.252
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	5.00	3.93
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton	June 12 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$65.50	$65.50	$65.50	$61.00	$53.00
Basic, Valley	64.50	64.50	64.50	60.00	52.00
Basic, deld., Phila.	68.38	68.38	68.38	63.76	56.75
No. 2 Fdry, Neville Island, Pa.	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, Chicago	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, deld., Phila.	68.88	68.88	68.88	64.26	57.25
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	65.00	65.00	65.00	60.50	52.50
Malleable, Chicago	65.00	65.00	65.00	60.50	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	215.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$56.50	$51.00	$44.50	$44.50	$44.00
No. 1 Heavy Melt, E. Pa.	56.50	56.50	50.00	48.00	42.50
No. 1 Heavy Melt, Chicago	54.00	49.50	40.50	47.50	42.50
No. 1 Heavy Melt, Valley	54.50	52.50	43.50	49.50	44.00
No. 1 Heavy Melt, Cleve.	51.50	49.50	38.50	47.50	43.00
No. 1 Heavy Melt, Buffalo	46.50	40.50	40.50	45.50	43.00
Rails, Rerolling, Chicago	66.50	62.50	58.50	69.50	52.50
No. 1 Cast, Chicago	46.50	46.50	40.50	45.50	45.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry., Connlsvl.	18.00	18.00	18.00	16.50	17.50

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But the picture wasn't entirely black. In many areas—in small towns and big cities—the terrible upward trend was reversed.

This was accomplished by community action—by business leaders, civic organizations, church, fraternal and PTA groups joining together with law enforcement agencies in an all-out attack on traffic deaths.

The figures prove it. Wherever people get together to do something about traffic safety, *deaths go down.*

BACK THE ATTACK ON TRAFFIC ACCIDENTS!

Your company can perform an invaluable service for your community, and for the country as a whole, by pitching in and helping in this life-saving crusade. For full information on what you can do — and how you can do it—write The National Safety Council, Chicago 11, Illinois.

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Steel Prices

Mill prices as reported to STEEL, June 12, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 166; to footnotes, page 168.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit S41 .....$74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS

Carbon, Rerolling (NT)

Bessemer,Pa. U5 ....$74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ....80.00
Munhall,Pa. U5 .....74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ...74.00
Sterling,Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 .....91.50
Houston S5 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14..91.50
S.Duquesne,Pa. U5 ...91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$107.00
Bridgeport,Conn. N19..107.00
Buffalo R2 .....107.00
Canton,O. R2, T7 ....107.00
Conshohocken,Pa. A3 .114.00
Detroit S41 .....107.00
Fontana,Calif. K1 ...128.00
Gary,Ind. U5 .....107.00
Houston S5 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ...107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 ....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ..107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14..111.50
S.Duquesne,Pa. U5 ...111.50

SKELP

Aliquippa,Pa. J5 .....4.725
LoneStar,Tex. L6 .....5.025
Munhall,Pa. U5 .....4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ...4.625

WIRE RODS

AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston S5 .....6.05
IndianaHarbor,Ind. Y1 ..5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 .....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 .....6.05
Monessen,Pa. P17 .....5.80
N.Tonawanda,N.Y. B11..5.80
Pittsburg,Calif. C11 ....6.80
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 .....5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Atlanta A11 .....5.20
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.00
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 .....5.75
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston S5 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
Joliet,Ill. P22 .....5.00
KansasCity,Mo. S5 .....5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.65
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 .....5.75
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14..5.00
S.SanFrancisco B3 .....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 .....5.00

Wide Flange

Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.90
IndianaHarbor,Ind. I-2..5.25
Lackawanna,N.Y. B2 ...5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston S5 .....7.45
Ind.Harbor,Ind. I-2, Y1..7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. S5 .....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 .....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Lackawanna,N.Y. B2 ..5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky.(15) A10 ..4.85
Bessemer,Ala. T2 .....4.85
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 .....5.70
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ..4.95
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 ..5.60
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 .....5.05
Harrisburg,Pa. P4 .....5.80
Houston S5 .....4.95
Ind.Harbor,Ind. I-2, Y1..4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. A2 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14..4.85
SparrowsPoint,Md. B2 ..4.85
Sterling,Ill. N15 .....4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Youngstown R2, U5, Y1..4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....6.20
Fontana,Calif. K1 .....7.00
Geneva,Utah C11 .....6.25
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 .....11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston S5 .....7.35
Ind.Harbor,Ind. I-2, Y1..7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy

Aliquippa,Pa. J5 .....6.85
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 .....6.85
Houston S5 .....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. A2 .....6.85
Pittsburgh J5 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 .....6.275
Ind.Harbor,Ind. I-2 ...5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10..5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5....5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.275
Bessemer,Ala.(9) T2 ...5.075
Birmingham(9) C15 ....5.075
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa.(9) U5 ....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ...5.825
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Houston(9) S5 .....5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ....5.525
Niles,Calif. P1 .....5.775
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 .....5.825
Seattle B3, N14 .....5.825
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5..5.075
S.SanFran.,Calif.(9)B3 5.825
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ...5.45
Torrance,Calif.(9) C11.5.775
Youngstown(9) R2, U5.5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.125
Bethlehem,Pa. B2 .....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2, T7 .....6.125
Clairton,Pa. U5 .....6.125
Detroit S41 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 .....7.175
Gary,Ind. U5 .....6.125
Houston S5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. S5 .....6.375
Lackawanna,N.Y. B2 ...6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
Pittsburgh J5 .....6.125
S.Chicago R2,U5,W14 ..6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 .....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 .....8.125
Gary,Ind. U5 .....7.425
Houston S5 .....7.675
Ind.Harbor,Ind. Y1 ....7.425
Johnstown,Pa. B2 .....7.425
KansasCity,Mo. S5 .....7.675
Lackawanna,N.Y. B2 ...7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Duquesne,Pa. U5 ....7.425
S.Chicago,Ill. U5, W14.7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.225
Houston(9) S5 .....5.325
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ...5.075
Tonawanda,N.Y. B12 ...5.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.075
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco S7 .....5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.45
KansasCity,Mo. S5 ....6.45
Pittsburgh J5 .....6.20
Youngstown U5 .....6.20

BARS, C.F., Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles P2 .....11.35
Monaca,Pa. S17 .....9.475
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....6.85
BeaverFalls,Pa. M12,R2..6.85
Birmingham C15 .....7.45
Bridgeport,Conn. N19 ..7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 .....6.85
Detroit B5, P17 .....7.05
Detroit S41 .....6.85
Donora,Pa. A7 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5 ...6.85
Gary,Ind. R2 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13..6.85
Hartford,Conn. R2 ....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ....8.30
LosAngeles R2 .....8.75
LosAngeles P2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ...6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 ....7.10
Putnam,Conn. W18 ....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 ....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....8.325
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 .....8.525
Detroit S41 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2,M13.8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles S30 .....10.10
LosAngeles P2 .....10.20
Mansfield,Mass. B5 ...8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 ....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.275
Birmingham C15 .....5.075
Bridgeport,Conn. N9 ...5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ...5.825

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Fairfield,Ala. T2 ....5.075
Fairless.Pa. U5 .....5.225
Fontana,Calif. K1 ....5.775
Ft.Worth,Tex.(4) T4 ..5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.775
Pittsburg,Calif. C11 ...5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.825
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 .....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint, Md. B2.5.075
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ...5.65
Torrance,Calif. C11 ...5.775
Youngstown R2, U5 ...5.075

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 .....7.00
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4)(44) I-2 5.075
ChicagoHts.(4) C2 ....5.075
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ...5.075
JerseyShore,Pa.(4) J8 ..5.10
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.65
Williamsport,Pa.(3) S19.5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14. 16.80
McK.Rks (S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown U5, Y1 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2.....6.90
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 ....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1.6.90
Irvin,Pa. U5.....6.90
Lackawanna(35) B2 ...6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee W.Va. F4 ..5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1.5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middeltown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 .....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1.8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2.8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.65	6.90
Canton,O. R2	....6.65	7.15
Fairfield T2	.....6.65	6.90
Gary,Ind. U5	.....6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	...6.65	6.90
Irvin,Pa. U5	.....6.65	6.90
Kokomo,Ind. C16	.6.75	...
MartinsFry. W10	.6.65	6.90
Pittsburgh J5	....6.65	...
Pitts.,Calif, C11	...7.40	...
SparrowsPt. B2	..6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ...6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ...6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....7.025

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 .....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).8.95
Butler,Pa. A10 (type 2).9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 .....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.35
Ind.Harbor,Ind. I-2 ....8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 .....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wiekwire Spencer Steel Div., Colo.Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J.Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.
E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H7 Helical Tube Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.
N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Dawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U5 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel&Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.675
Allenport,Pa. P7 .....4.675
Alton,Ill. L1 .....4.875
Ashland,Ky.(8) A10 ...4.675
Atlanta A11 .....4.875
Bessemer,Ala. T2 .....4.675
Birmingham C15 .....4.675
Buffalo(27) R2 .....4.675
Conshohocken,Pa. A3 ..4.725
Detroit M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fontana Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Houston S5 .....4.925
Ind.Harbor Ind. I-2, Y1 4.675
Johnstown,Pa.(25) B2..4.675
KansasCity,Mo. S5 ....4.925
Lackawanna,N.Y.(25) B2 4.675
LosAngeles(25) B3 ....5.425
Minnequa,Colo. C10 ....5.775
Pittsburg,Calif. C11 ...5.425
Riverdale,Ill. A1 .....4.675
SanFrancisco S7 .....5.95
Seattle(25) B3 .....5.675
Seattle N14 .....5.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
S.SanFrancisco(25) B3 5.425
SparrowsPoint,Md. B2..4.675
Sterling,Ill.(1) N15 ....4.675
Sterling Ill. N15 .....4.775
Torrance,Calif. C11 ...5.425
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5 .....4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
LosAngeles B3 .....8.95
Newport,Ky. A2 .....7.75
Sharon Pa. S3 .....7.75
S.Chicago,Ill. W14 ....7.75
Youngstown U5, Y1.....7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 .....6.95
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.05
Fairfield,Ala. T2 .....6.95
Gary,Ind. U5 .....6.95
Houston S5 .....7.20
Ind.Harbor,Ind. I-2, Y1.6.95
KansasCity,Mo. S5 ....7.20
Lackawanna,N.Y. B2 ..6.95
LosAngeles(25) B3 .....7.70
Seattle(25) B3 .....7.95
Sharon,Pa. S3 .....6.95
S.SanFrancisco(25) B3 ..7.70
SparrowsPoint,Md. B2 ..6.95
Warren O. R2 .....6.95
Weirton,W.Va. W6 .....6.95
Youngstown U5, Y1 ....6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...4.925
Warren,O. R2 .....5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....6.85
Baltimore T6 .....6.85
Boston T6 .....7.40
Buffalo S40 .....6.85
Cleveland A7, J5 .....6.85
Conshohocken,Pa. A3 ..6.90
Dearborn Mich. D3 ....6.95
Detroit D2, M1, P20 ...6.95
Dover,O. G6 .....6.85
Ecorse,Mich. G5 .....6.95
Evanston,Ill. M22 .....6.95
Follansbee,W.Va. F4 ...6.85
Fontana,Calif. K1 .....8.70
FranklinPark,Ill. T6 ..6.95
Ind.Harbor,Ind. Y1 ....6.85
Indianapolis C8 .....7.00
LosAngeles C1 .....8.90
NewBedford,Mass. R10..7.30
NewBritain(10) S15 ....6.85
NewCastle,Pa. B4, E5 ..6.85
NewHaven,Conn. D2 ....7.30
NewKensington,Pa. A6..6.85
Pawtucket,R.I. R3 .....7.50
Pawtucket,R.I. N8 .....7.40
Pittsburgh J5 .....6.85
Riverdale,Ill. A1 .....6.95
Rome,N.Y.(32) R6 .....6.85
Sharon,Pa. S3 .....6.85
Trenton,N.J.(31) R5 ....8.30
Wallingford,Conn. W2...7.30
Warren O. R2, T5 .....6.85
Weirton W.Va. W6 .....6.85
Worcester,Mass. A7 ....7.40
Youngstown C8, Y1 ....6.85

STRIP, Cold-Rolled Alloy

Boston T6 .....14.90
Carnegie,Pa. S18 .....14.55
Cleveland A7 .....14.55
Dover,O. G6 .....14.55
FranklinPark,Ill. T6 ..14.55
Harrison,N.J. C18 .....14.55
Indianapolis C8 .....14.70
Pawtucket,R.I. N8 .....14.90
Sharon,Pa. S3 .....14.55
Worcester,Mass. A7 ...14.85
Youngstown C8 .....14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.00
Dearborn,Mich. D3 ....10.10
Dover,O. G6 .....10.10
Ecorse,Mich. G5 .....10.10
Ind.Harbor,Ind. Y1 ....10.20
Sharon,Pa. S3 .....10.00
Warren,O. R2 .....10.00
Weirton,W.Va. W6 ....10.00
Youngstown Y1 .....10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol,Conn. W1	....	10.40	12.60	15.60	18.55
Carnegie,Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	....	10.10	12.30	15.30	18.25
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
Detroit D2	8.75	10.20	12.40	15.40	....
Dover,O. G6	8.65	10.10	12.30	15.30	18.25
Evanston,Ill. M22	8.65	10.10	12.30	....	....
FranklinPark,Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison,N.J. C18	....	....	12.60	15.60	18.55
Indianapolis C8	8.80	10.25	12.30	15.30	18.25
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15	8.65	10.10	12.30	15.30	18.25
NewCastle,Pa. B4, E5	8.65	10.10	12.30	15.30	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	8.65	10.10	12.30	15.30	....
New York W3	....	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale,Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome N.Y.(32) R6	8.65	10.10	12.30	15.30	18.25
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J R5	....	10.40	12.60	15.60	18.55
Wallingford,Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	8.65	10.10	12.30	15.30	18.25
Worcester,Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	8.65	10.10	12.30	15.30	18.25

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	17.10	20.95	25.30
Buffalo W12	17.10	....	....
FranklinPark,Ill. T6	17.45	21.30	25.65
Harrison,N.J. C18	17.10	20.95	25.30
New York W3	17.10	20.95	25.30
Palmer,Mass. W12	17.10	....	....
Trenton,N.J. R5	17.10	20.95	25.30
Worcester,Mass. A7, T6	17.10	20.95	25.30
Youngstown C8	17.45	21.30	25.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.60

STRIP, C.R. Electrogalvanized

Cleveland A7 .....6.85*
Dover,O. G6 .....6.85*
Evanston,Ill. M22 .....6.95
Riverdale,Ill. A1 .....6.95*
Warren,O. B9, T5 ....6.85*
Worcester,Mass. A7 ...7.40*
Youngstown C8 .....6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.975

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.40
Riverdale,Ill. A1 .....5.25
Sharon,Pa. S3 .....5.10
Youngstown U5 .....5.10

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	...	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	....	11.525	12.575 13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	....	...	10.85†	11.525†	12.575† 13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths. ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala.T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.85
Fairfield,Ala. T2 .....7.95
Fairless,Pa. U5 .....7.95
Fontana,Calif. K1 .....8.60
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 .....7.95
Ind.Harbor,Ind. I-2, Y1.7.85
Irvin,Pa. U5 .....7.85
Niles,O. R2 .....7.85
Pittsburg,Calif. C11 ....8.60
SparrowsPoint,Md. B2 ...7.95
Weirton,W.Va. W6 .....7.85
Yorkville,O. W10 .....7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....$7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.20
Aliquippa,Pa. J5 .....7.20
Alton,Ill. L1 .....7.40
Atlanta A11 .....7.40
Bartonville,Ill. K4 .....7.30
Buffalo W12 .....7.20
Chicago W13 .....7.20
Cleveland A7, C20 .....7.20
Crawfordsville,Ind. M8..7.30
Donora,Pa. A7 .....7.20
Duluth A7 .....7.20
Fairfield,Ala. T2 .....7.20
Fostoria,O.(24) S1 .....7.30
Houston S5 .....7.45
Jacksonville,Fla. M8 ...7.55
Johnstown,Pa. B2 .....7.20
Joliet,Ill. A7 .....7.20
KansasCity,Mo. S5 .....7.45
Kokomo,Ind. C16 .....7.30
LosAngeles B3 .....8.15
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16...7.20
N.Tonawanda,N.Y. B11.7.20
Palmer,Mass. W12 .....7.50
Pittsburg,Calif. C11 ....8.15
Portsmouth,O. P12 .....7.20
S.Chicago,Ill. R2 .....7.20
S.SanFrancisco C10 ....8.15
SparrowsPoint,Md. B2 ..7.30
Sterling,Ill.(1) N15 .....7.20
Sterling,Ill. N15 .....7.30
Struthers,O. Y1 .....7.20
Waukegan,Ill. A7 .....7.20
Worcester,Mass. A7 ....7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....11.90
Buffalo W12 .....11.90
Cleveland A7 .....11.90
Donora,Pa. A7 .....11.90
Duluth A7 .....11.90
Johnstown,Pa. B2 .....11.90
Minnequa,Colo. C10 ...12.025
Monessen,Pa. P16 .....11.90
Muncie,Ind. I-7 .....12.10
NewHaven,Conn. A7 ...12.20
Palmer,Mass. W12 .....12.20
Pittsburg Calif. C11 ....12.70
Portsmouth,O. P12 .....11.90
Roebling,N.J. R5 .....12.20
SparrowsPt.,Md. B2 ....12.00
Struthers,O. Y1 .....11.90
Trenton,N.J. A7 .....12.20
Waukegan,Ill. A7 .....11.90
Worcester,Mass. A7 ....12.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....8.70
Alton,Ill. L1 .....8.90
Buffalo W12 .....8.70
Cleveland A7 .....8.70
Donora,Pa. A7 .....8.70
Duluth A7 .....8.70
Johnstown Pa. B2 .....8.70
KansasCity,Mo. S5 .....8.95
Minnequa,Colo. C10 ....8.90
LosAngeles B3 .....9.65
Monessen,Pa. P7, P16..8.70
NewHaven,Conn. A7 ...9.00
Palmer,Mass. W12 .....9.00
Pittsburg,Calif. C11 ....9.65
Portsmouth,O. P12 .....8.70
Roebling,N.J. R5 .....9.00
S.Chicago,Ill. R2 .....8.70
S.SanFrancisco C10 ....9.65
SparrowsPt.,Md. B2 ....8.80
Struthers,O. Y1 .....8.70
Trenton,N.J. A7 .....9.00
Waukegan,Ill. A7 .....8.70
Worcester,Mass. A7 ....9.00

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....9.025
Alton,Ill. L1 .....9.225
Bartonville,Ill. K4 .....9.125
Buffalo W12 .....9.025
Cleveland A7 .....9.025
Donora,Pa. A7 .....9.025
Duluth A7 .....9.025
Fostoria,O. S1 .....9.075
Johnstown,Pa. B2 .....9.025
LosAngeles B3 .....9.975
Milbury,Mass.(12) N6..9.325
Minnequa,Colo. C10 ...9.275
Monessen,Pa. P7, P16..9.025
Muncie,Ind. I-7 .....9.225
Palmer,Mass. W12 .....9.325
Pittsburg,Calif. C11 ....9.975
Portsmouth,O. P12 .....9.025
Roebling,N.J. R5 .....9.325
S.Chicago,Ill. R2 .....9.025
S.SanFrancisco C10 ....9.975
SparrowsPt.,Md. B2 ....9.125
Struthers O. Y1 .....9.025
Trenton,N.J. A7 .....9.325
Waukegan,Ill. A7 .....9.025
Worcester J4, T6, W12..9.325
Worcester,Mass. A7 ....9.325

WIRE, Fine & Weaving(8" Coils)

Alton,Ill L1 .....14.65
Bartonville,Ill. K4 .....14.55
Buffalo W12 .....14.45
Chicago W13 .....14.45
Cleveland A7 .....14.45
Crawfordsville,Ind. M8.14.25
Fostoria,O. S1 .....14.45
Jacksonville,Fla. M8 ..14.50
Johnstown Pa. B2 .....14.45
Kokomo,Ind. C16 .....14.45
Monessen,Pa. P7 .....14.45
Muncie,Ind. I-7 .....14.65
Palmer,Mass. W12 .....14.75
Roebling,N.J. C10 .....14.45
S.SanFrancisco C10 ....14.80
Waukegan,Ill. A7 .....14.45
Worcester,Mass. A7, T6..14.75

ROPE WIRE

Bartonville,Ill. K4 .....12.00
Buffalo W12 .....12.00
Fostoria,O. S1 .....12.00
Johnstown Pa. B2 .....12.00
Monessen,Pa. P7 .....12.00
Muncie,Ind. I-7 .....12.20
Palmer,Mass. W12 .....12.30
Portsmouth,O. P12 .....12.00
Roebling,N.J. R5 .....12.30
SparrowsPt.,Md., B2 ...12.10
Struthers,O. Y1 .....12.00
Worcester,Mass. J4 .....12.30
(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.75
Monessen,Pa. P16	15.45
Roebling,N.J. R5	16.10

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Chicago W13	10.85
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	11.05
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	164
Aliquippa,Pa. J5	164
Atlanta A11	166
Bartonville,Ill. K4	166
Crawfordsville,Ind. M8	166
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jacksonville,Fla.(20) M8	175
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
KansasCity,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. P7	164
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill.(7) N15	166
Worcester,Mass. A7	170

NAILS, Stock

	Col.
Chicago W13	164
Cleveland A9	170

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$9.82
Atlanta A11	9.63
Bartonville,Ill. K4	9.63
Buffalo W12	9.82
Chicago W13	9.82
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.82
Duluth A7	9.82
Fairfield,Ala. T2	9.82
Houston S5	10.07
Jacksonville,Fla. M8	10.09
Johnstown,Pa. B2	9.82
Joliet,Ill. A7	9.82
KansasCity,Mo. S5	10.07
Kokomo,Ind. C16	9.92
LosAngeles B3	10.61
Minnequa,Colo. C10	10.07
Pittsburg,Calif. C11	10.60
S.Chicago,Ill. R2	9.82
S.SanFrancisco C10	10.60
SparrowsPt.,Md. B2	9.92
Sterling,Ill.(37) N15	9.82

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.15
Atlanta A11	9.95
Bartonville,Ill. K4	9.95
Buffalo W12	10.15
Chicago W13	10.15
Crawfordsville,Ind. M8	9.95
Donora,Pa. A7	10.15
Duluth A7	10.15
Fairfield,Ala. T2	10.15
Houston S5	10.40
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	10.15
Joliet,Ill. A7	10.15
KansasCity,Mo. S5	10.40
Kokomo,Ind. C16	10.25
LosAngeles B3	10.95
Minnequa,Colo. C10	10.40
Pittsburg,Calif. C11	10.95
S.Chicago,Ill. R2	10.15
S.SanFrancisco C10	10.95
SparrowsPt.,Md. B2	10.25
Sterling,Ill.(37) N15	10.15

Coil Interim

AlabamaCity,Ala. R2	$10.20
Atlanta A11	10.00
Bartonville,Ill. K4	10.00
Buffalo W12	10.20
Chicago W13	10.20
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	10.20
Duluth A7	10.20
Fairfield,Ala. T2	10.20
Houston S5	10.46
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	10.20
Joliet,Ill. A7	10.20
KansasCity,Mo. S5	10.45
Kokomo,Ind. C16	10.30
LosAngeles B3	11.00
Minnequa,Colo. C10	10.45
Pittsburg,Calif. C11	11.00
S.Chicago,Ill. R2	10.20
S.SanFrancisco C10	11.00
SparrowsPt.,Md. B2	10.30
Sterling,Ill.(37) N15	10.20

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	196
Atlanta A11	192
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	196
Duluth A7	196
Fairfield,Ala. T2	196
Houston S5	201
Jacksonville,Fla. M8	197
Joliet,Ill. A7	190
KansasCity,Mo. S5	201
Kokomo,Ind. C16	198
Minnequa,Colo. C10	201
Pittsburg,Calif. C11	220
S.SanFrancisco C10	220
Sterling,Ill.(7) N15	196
SparrowsPt.,Md. B2	198
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Sterling,Ill.(1) N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	184**
Aliquippa,Pa. J5	181§
Atlanta A11	190*
Bartonville,Ill. K4	190
Crawfordsville,Ind. M8	190
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	189**
Jacksonville,Fla. M8	195
Johnstown,Pa. B2	188*
Joliet,Ill. A7	184†
KansasCity,Mo. S5	189**
Kokomo,Ind. C16	186†
Minnequa,Colo. C10	189**
Monessen,Pa. P7	188*
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184**
S.SanFrancisco C10	204**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(7) N15	190*

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	176**
Aliq'ppa,Pa. 9-14½ga.J2	179§
Atlanta A11	182*
Bartonville,Ill. K4	182
Crawfordsville,Ind. M8	182
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	181**
Jacksonville,Fla. M8	187
Johnstown,Pa.(43) B2	180*
Joliet,Ill. A7	176†
KansasCity,Mo. S5	181**
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181**
Monessen,Pa. 9 ga. P7	180*
Pittsburg,Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(7) N15	182*

WIRE (16 gage)

	Stone	Stone
Ala.City,Ala.R2	16.00	17.55**
Aliq'ppa,Pa.	J5.15.70	17.50
Bartonville K4	15.80	17.75
Cleveland A7	16.00	....
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	16.50	18.05†
Houston S5	16.25	17.80**
Jacksonville M8	16.05	18.00
Johnstown B2	16.00	17.95*
Kan.City,Mo. S5	16.25	....
Kokomo C16	16.10	17.65†
Minnequa C10	16.25	17.80*
P'lm'r,Mass. W12	16.30	17.85†
Pitts.,Calif. C11	16.35	17.90†
SparrowsPt. B2	16.10	18.05*
Sterling(37) N15	16.00	17.95*
Waukegan A7	16.00	17.55†
Worcester A7	16.30	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	8.20	8.75**
Aliquippa J5	7.95	8.475§
Atlanta(48) A11	8.05	8.65*
Bartonville(48) K4	8.05	8.65
Buffalo W12	8.20	8.75†
Cleveland A7	8.20	....
Crawfordsville M8	8.05	8.65
Donora,Pa. A7	8.20	8.75†
Duluth A7	8.20	8.75†
Fairfield T2	8.20	8.75†
Houston(48) S5	8.45	9.00**
Jacks'ville,Fla. M8	8.30	8.90
Johnstown B2(48)	8.20	8.95*
Joliet,Ill. A7	8.20	8.75†
Kans.City(48) S5	8.45	9.00**
Kokomo C16	8.30	8.85†
LosAngeles B3	9.15	9.90*
Minnequa C10	8.45	9.00‡
Monessen P7(48)	7.95	8.55*
Palmer,Mass. W12	8.50	9.05†
Pitts.,Calif. C11	9.15	9.70†
Rankin,Pa. A7	8.20	8.75†
S.Chicago R2	8.20	8.75**
S.SanFran. C10	9.15	9.70*
Spar'wsPt. B2(48)	8.30	9.05*
Sterling(37)(48) N15	8.35	9.10
Struth'rs,O.(48) Y1	8.20	8.85‡
Worcester,Mass. A7	8.50	9.05†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	52.5
Longer than 6 in.	43.5
⅝ in. thru 1 in.:	
6 in. and shorter	43.5
Longer than 6 in.	41.5
1⅛ in. and larger:	
All lengths	41.5
Undersized Body (rolled thread)	
½ in. and smaller:	
6 in. and shorter	52.5

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	32.0
Longer than 6 in.	19.0
⅝ in. thru 1 in.:	
6 in. and shorter	16.0
Longer than 6 in.	16.0
1⅛ in. and larger:	
All lengths	16.0

Lag Bolts
All diameters:

6 in. and shorter	52.5
Longer than 6 in.	44.5

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	52.0
Larger than ½ in. or longer than 6 in.	44.5
Blank Bolts	44.5
Step, Elevator, Tire Bolts	52.0
Stove Bolts, Slotted	
⅛ to ¼-in. incl., 3 in. and shorter	54.00
⅛ to ½-in., inclusive	54.00

NUTS

Reg. & Heavy Square Nuts:	
All sizes	58.0
Square Nuts, Reg. & Heavy, Hot Galvanized:	
All sizes	44.0
Hex Nuts, Reg. & Heavy, Hot Pressed:	
¾ in. and smaller	61.5
⅞ in. to 1 in., incl.	57.5
1⅛ in. to 1½ in., incl.	62.5
1⅝ in. and larger	56.0
Hex Nuts, Reg. & Heavy, Cold Punched:	
¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0
Hex Nuts, All Types, Hot Galvanized:	
¾ in. and smaller	48.0
⅞ in. to 1 in., incl.	44.0
1⅛ in. to 1½ in., incl.	49.0
Hex Nuts, Semifinished, Heavy (Incl. Slotted):	
¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0
Hex Nuts, Finished (Incl. Slotted and Castellated):	
1 in. and smaller	64.00
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

Semifinished Hex Nuts, Reg. (Including Slotted):

⅝ in. and smaller	61.5
¾ in. to 1-in., incl.	64.0
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	44.0
¾, ⅞ and 1 in. diam.	27.0
Longer than 6 in.:	
⅝ in. and smaller	14.0
¾, ⅞ and 1 in. diam.	0.5

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	31.0
¾, ⅞ and 1 in. diam.	9.0
Longer than 6 in.:	
⅝ in. and smaller	+6
¾, ⅞ and 1 in. diam.	+24

Flat Head Capscrews:

¾ in. and smaller	+65.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:	
6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 11.50
⅞-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	23.54
1¼	13	....	29.07	23.36
1½	13	27.45	32.14	25.83
1¾	13	32.43	37.97	30.51
2	13	36.34	42.56	34.20
2¼	13	40.93	47.94	38.52
2¼	12	44.42	52.03	41.81
2½	12	48.94	57.31	46.05
2¾	12	52.99	62.05	49.88
3	12	56.51	66.18	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.275	5.175	5.225	6.25
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Huntington,W.Va. C15	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	...
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	...
Johnstown,Pa. B2	....	....	...(16)	6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	...
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.275
Gary,Ind. U5	6.275
Ind.Harbor,Ind. I-2	6.275
Lackawanna,N.Y. B2	6.275
Minnequa,Colo. C10	6.275
Seattle B3	6.425
Steelton,Pa. B2	6.275
Torrance,Calif. C11	6.425

JOINT BARS

Bessemer,Pa. U5	6.60
Fairfield,Ala. T2	6.60
Ind.Harbor,Ind. I-2	6.60
Joliet,Ill. U5	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Steelton,Pa. B2	6.60

AXLES

Ind.Harbor,Ind. S13	8.35
Johnstown,Pa. B2	8.35

TRACK BOLTS, Untreated

Cleveland R2	13.85
KansasCity,Mo. S5	13.85
Lebanon,Pa. B2	13.85
Minnequa,Colo. C10	13.85
Pittsburgh P14	13.10
Seattle B3	14.35

SCREW SPIKES

Lebanon,Pa. B2	13.60
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.225
Ind.Harbor,Ind. I-2, Y1	9.225
KansasCity,Mo. S5	9.225
Lebanon,Pa. B2	9.225
Minnequa,Colo. C10	9.225
Pittsburgh J5	9.225
Seattle B3	9.725
S.Chicago,Ill. R2	9.225
Struthers,O. Y1	9.225
Youngstown R2	9.225

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+20.25	1.25	+15.5	3.75	+13	5.25	+11.5	5.25	+11.5	5	+11.75	7.5	+9.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+20.25	1.25	+15.5	3.75	+13	5.25	+11.5	5.25	+11.5	5	+11.75	7.5	+9.25
Youngstown Y1	+5.25	+20.25	1.25	+15.5	3.75	+13	5.25	+11.5	5.25	+11.5	5	+11.75	7.5	+9.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+20.25	1.25	+15.5	3.75	+13	5.25	+11.5	5.25	+11.5	5	+11.75	7.5	+9.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+6	12.25	+2	15.75	2.5	18.25	3.25
Alton, Ill. L1	....	....	....	....	....	....	7.25	+8	10.25	+4	13.75	0.5	16.25	1.25
Benwood, W. Va. W10	6.5	+20	+4.75	+28.25	+14.75	+36.25	9.25	+6	12.25	+2	15.75	2.5	18.25	3.25
Butler, Pa. F6	7.5	+19	+3	+26.5	+12.5	+34	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+6	12.25	+2	15.75	2.5	18.25	3.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+8	10.25	+4	13.75	0.5	16.25	1.25
Fontana, Calif. K1	....	....	....	....	....	....	3.75	+19	+0.75	+15	2.75	+10.5	5.25	+9.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+7	11.25	+3	14.75	1.5	17.25	0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+6	12.25	+2	15.75	2.5	18.25	3.25
Sharon, Pa. S4	6.5	+20	+4	+27.5	+13.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+6	12.25	+2	15.75	2.5	18.25	3.25
Sparrows Pt., Md. B2	5.5	+21	+0.5	+28.5	+14.5	+36	7.25	+8	10.25	+4	13.75	0.5	16.25	1.25
Wheatland, Pa. W9	7.75	+19	+3	+26.5	+12.5	+34	9.25	+6	12.25	+2	15.75	2.5	18.25	3.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+6	12.25	+2	15.75	2.5	18.25	3.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	4.25	19.25	4.75	20.75	4.5	20.75	4.5	....	....	....	....
Alton, Ill. L1	16.75	2.25	17.25	3.75	18.75	2.5	18.75	2.5	....	....	....	....
Benwood, W. Va. W10	18.75	4.25	19.25	4.75	20.75	4.5	20.75	4.5	10.25	+6.5	10.25	+6.5
Etna, Pa. N2	18.75	4.25	19.25	4.75	20.75	4.5	20.75	4.5	10.25	+6.5	10.25	+6.5
Fairless, Pa. N3	16.75	2.25	17.25	3.75	18.75	2.5	18.75	2.5	8.25	+8.5	8.25	+8.5
Fontana, Calif. K1	5.75	+8.75	6.25	+8.25	7.75	+8.5	7.75	+8.5	+2.75	+19.5	+2.75	+19.5
Indiana Harbor, Ind. Y1	17.75	3.25	18.25	3.75	19.75	3.5	19.25	3.5	9.25	+7.5	9.25	+7.5
Lorain, O. N3	18.75	4.25	19.25	4.75	20.75	4.5	20.75	4.5	....	....	....	....
Sharon, Pa. M6	18.75	4.25	19.25	4.75	20.75	4.5	20.75	4.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	2.25	17.25	3.75	18.75	2.5	18.75	2.5	8.25	+8.5	8.25	+8.5
Wheatland, Pa. W9	18.75	4.25	19.25	4.75	20.75	4.5	20.75	4.5	10.25	+6.5	10.25	+6.5
Youngstown R2, Y1	18.75	4.25	19.25	4.75	20.75	4.5	20.75	4.5	10.25	+6.5	10.25	+6.5

*Galvanized pipe discounts based on current price of zinc (11.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates—Carbon Base %02	%02	%51	%01	Sheets Carbon Base %5
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.95	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb
Regular Carbon	0.290
Extra Carbon	0.345
Special Carbon	0.41-0.45
Oil Hardening	0.450

Grade	$ per lb
Cr Hot Work	0.45-0.495
W-Cr Hot Work	0.43-0.475
V-Cr Hot Work	0.460
Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Alabama City, Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	64.50	65.00	65.50	66.00
Tonawanda, N.Y. W12	64.50	65.00	65.50	66.00
N. Tonawanda, N.Y. T9	....	65.00	65.50	66.00
Boston, deld.	75.79	76.29	76.79	....
Rochester, N.Y., deld.	67.52	68.02	68.52	....
Syracuse, N.Y., deld.	68.62	69.12	69.62	....
Chicago District				
Chicago I-3	64.50	65.00	65.00	65.50
S. Chicago, Ill. R2	64.50	....	65.00	....
S. Chicago Ill. Y1	64.50	65.00	65.00	....
S. Chicago, Ill. W14	64.50	....	65.00	65.50
Milwaukee, deld.	66.96	67.46	67.46	67.96
Muskegon, Mich., deld.	....	78.83	78.83	....
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron, O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro, Pa. B10	66.50	67.00	67.50	68.00
Chester, Pa. P4	66.50	67.00	67.50	....
Swedeland, Pa. A3	66.50	67.00	67.50	68.00
New York deld.	....	73.20	73.70	....
Newark, N.J., deld.	70.52	71.02	71.52	72.02
Philadelphia, deld.	68.38	68.88	69.38	69.88
Troy, N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
Neville Island, Pa. P6	64.50	65.00	65.00	65.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	66.45	66.45	66.98
McKees Rocks, Pa., deld.	....	66.10	66.10	66.63
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	66.76	66.76	67.29
Verona Trafford, Pa., deld.	66.79	67.32	67.32	67.85
Brackenridge, Pa., deld.	67.10	67.60	67.60	68.13
Midland, Pa. C18	64.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard, O. Y1	....	....	65.00	....
Sharpsville, Pa. S6	64.50	....	65.00	65.50
Youngstown Y1	....	....	65.00	65.50
Mansfield, O., deld.	69.40	....	69.90	70.40
Duluth I-3	64.50	65.00	65.00	65.50
Erie, Pa. I-3	64.50	65.00	65.00	65.50
Everett, Mass. E1	66.00	66.50	67.00	....
Fontana, Calif. K1	72.50	73.00	....	....
Geneva, Utah C11	64.50	65.00	....	....
Granite City, Ill. G4	66.40	66.90	67.40	....
Ironton, Utah C11	64.50	65.00	....	....
Minnequa, Colo. C10	66.50	67.00	67.50	....
Rockwood, Tenn. T3	....	59.00‡	63.00	....
Toledo, O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$105.50
Niagara Falls, N.Y. P15	105.50
Keokuk, Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max frgt allowed up to $9. K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood, Tenn. T3 (Phos. 0.035% max)	78.50
Troy, N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	69.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[9]		Carbon	Floor
Atlanta	8.17§	9.37§	9 83§	....	8.21	8.45	10.23	....	8.59	8 55	10.51
Baltimore	7.88	8.98	9.31	....	8.36	8.53	9.13[9]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	8.84	9.88	9.24	60.42	8.89	9.07	....	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.68	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.78	9.00	9.65	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.65	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.55	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9 70	11.30	12.49	....	9.80	9.95	10.65	18.89	9.80	9.70	11.40
Detroit	8.03	9.25	10.00	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.85	9.00	9.60[10]	....	7.95	8.20	8.70[10]	....	8.50	8.35	9.75
Houston	8.80	9.75	10 99	....	7.75	8.05	9.15	15.00	8.00	8.80	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	12.30	11.25	57.45	9.15	9.20	12.10	15.50	9 15	9.65	11.80
Milwaukee	7.93	9.13	9 93	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.13	9.35	10.05	....	8.17	8.42	8.70	....	8.55	8.51	...
New York	8.45	9.66	10.21	60.20	8.90	9.01	....	14.59	8.91	9.01	10.31
Norfolk, Va.	8.05	...	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.24	50.69	8.82	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10 00	50 00	7 92	8.07	8.60	14.15	8.20	8.16	9.49
Portland, Oreg.	9.20	11.20	11 55	55.20	11.05‡‡	9.35	13.80	14.60	9.35	9 00	12 20
Richmond, Va.	8.00	...	10 14	....	8.55	8.40	10.00	....	8.95	8.40	9 90
St Louis	8.14	9.34	10 16	73.36	8.19	8.43	8.96	14.51	8 67	8.52	9 86
St. Paul	8.39	9.59	10 26	....	8.43	8.68	9.21	....	8 94	8 90	10 10
San Francisco	9.05	10.95	10 90	53 45	9 05	9.15	12 40	15 60	9 15	9.30	11 55
Seattle	9.55	10 70	11 65	55.20	9 55	9.50	13 40	15 85	9 35	9 30	11 70
Spokane, Wash.	9.55	10 70	11 65	....	9 55	9.50	13.40	16.60	9 35	9 30	11 70
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 11.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **⅛-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle: 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [8]—400 to 999 lb; [9]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Philadelphia, $137; Woodbridge, N.J., $135.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $100; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜-in. grains with fines: Baltimore, $72.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60% $33-$36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34-$35; Mexican, all-rail, duty paid, $27-$27.75; barge, Brownsville, Tex., $27.75-$29.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi river, ocean bags 23,000 lb and over..	10.50
F.o.b. Riverton or Camden, N.J., west of Mississippi river,	9.50
Sponge Iron, domestic, 98 + % Fe: Deld. east of Mississippi river, 23,000 lb and over	10.50
F.o.b. Riverton, N.J., west of Mississippi river	9.50
Sponge Iron, Canadian: F.o.b. shipping point	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	26.00
Annealed, 99.5% Fe..	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, *93.00-290.00* in standard 200-lb containers; all minus 200 mesh.	

	Dollars
Aluminum: Atomized, 500 lb drum, frght allowed	
Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots .....34.30-43.00†	
Bronze, 5000-lb lots .....52.80-57.20†	
Copper: Electrolytic 14.25*	
Reduced 14.25*	
Lead	7.50*
Manganese: Minus 35 mesh ...	64.00
Minus 100 mesh ...	70.00
Minus 200 mesh ...	75.00
Nickel, unannealed ...$1.065	
Nickel-Silver, 5000-lb lots .....52.90-57.20†	
Phosphor-Copper, 5000-lb lots	62.00
Copper (atomized) 5000-lb lots .....44.50-52.00‡	
Silicon	47.50
Solder	7.00*
Stainless Steel, 304 ..	$1.08
Stainless Steel, 316 ..	$1.44
Tin 14.50*	
Zinc, 5000-lb lots	18.50-31.70‡
Tungsten: Melting grade, 99% 60 to 2000 mesh:	Dollars
1000 lb and over	4.00
Less than 1000 lb ..	4.15
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Inches Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5½	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305...	$7.13	$7.13	$7.13	$7.36
Bar Size Angles	6.77	6.77	6.77	7.00
Structural Angles	6.77	6.77	6.77	7.00
I-Beams	7.17	7.17	7.17	7.41
Channels	7.17	7.17	7.17	7.41
Plates (basic bessemer)	9.00	9.00	9.00	9.30
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.62	26.62	26.62	27.77
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.95	6.95	6.95	7.30
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods Thomas Commercial No. 5.....	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5.	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	8.38	8.38	8.38	8.58

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	*$20.00-$23.00*
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$55.00-58.00
48% 2.8:1	52.00-55.00
48% no ratio	46.00-48.00
South African Transvaal	
48% no ratio	$40.00-41.00
44% no ratio	30.00-31.00
Turkish	
48% 3:1	$59.00-62.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.10-3.60
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens..	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.80 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

(*Concluded from page* 162)

ster Engineering Corp., Boston, engineer-contractor.

700 tons, Missabe crossing, Erie Mining Co., Aurora, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

660 tons, state bridge work, Oneida county, New York, through Hogecomb & Campbell, general contractors, to Lehigh Structural Steel Co., Allentown, Pa.

550 tons, conveyor supporting steel, municipal power house, E. 59th street, New York, through the T. J. Carlin Construction Co., general contractor, Long Island City, N.Y., to Lehigh Structural Steel Co., Allentown, Pa.

470 tons, four grade separation structures, Middletown, Conn., to the Bethlehem Steel Co., Bethlehem, Pa., through D. Arrigoni, Middletown, general contractor.

250 tons, 2-span rolled beam bridge and 3-span viaduct, Thomaston, Conn., to the Haarmann Steel Co., Holyoke, Mass., through Oneglia & Gervasini Inc., Torrington, Conn., general contractor.

165 tons, rolled beam composite bridge, Derby-Ansonia-Seymour expressway, Connecticut, to Phoenix Bridge Co., Phoenixville, Pa.; L. G. DeFalice & Son Inc., North Haven, Conn., general contractor.

150 tons, four Delta river bridges, Alaska, to the Isaacson Iron Works, Seattle; Nygren Construction Co., Seattle, general contractor, low at $391,710 to the Bureau of Public Roads, Juneau, Alaska.

135 tons, state bridge, Berks county, Pennsylvania, to the Lehigh Structural Steel Co., Allentown, Pa.

103 tons, county bridge, Sawkill, N.Y., through Anthony Costanci, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

10,000 tons, state viaduct, FAC-56 and 7, Erie county, New York, two direct bids: Schacht Steel Construction Inc., New York, $4,399,378, and Bethlehem Steel Co., Bethlehem, Pa., $5,202,946.50.

4900 tons, superstructure-deck, 12-span plate girder bridge, Connecticut river, Windsor Locks-East Windsor, Hartford-Springfield expressway, Connecticut; Consolidated Builders Inc., North Attleboro, Mass., low on general contract.

2475 tons, state bridge work, FAC-57-5 and FASH-57-11, Steuben county, New York, Dalrymple Gravel & Contracting Co., Elmira, N.Y., low on general contract.

2300 tons, state bridge work, Owega county, New York, project withdrawn.

1386 tons, state bridge work, FISH-57-12, Jefferson county, New York, A. J. Orlando Contracting Co. and Edenwald Contracting Co., Whitestone, N.Y., low jointly on general contract.

800 tons, state highway bridges, Reading-Woburn, Mass.; Consolidated Builders Inc., and J. F. White Contracting Co., Cambridge, Mass., low joint bidders, general contract.

400 tons, Brandywine high school, Newcastle, Del.; bids July 18.

321 tons, state bridge work, FARC-57-66, Schoharie county, New York, Howes & Farrell Inc., Oneida, N.Y., low on general contract.

181 tons, state bridge work, FARC-57-71, Ontario county, New York, Bero Construction Corp., Waterloo, N.Y., low on general contract.

150 tons, 250 kv switchyard equipment and structures, Rocky Reach project, Wenatchee, Wash.; General Electric Co. apparently low at $361,000.

80 tons, also 45 tons of reinforcing bars and 3750 ft of steel piling, Chilkat river bridge, Alaska; bids in to the Bureau of Public Roads, Juneau, Alaska, July 2.

REINFORCING BARS . . .

REINFORCING BARS PLACED

220 tons, office building, First Federal Savings & Loan Association, Washington, D. C., to Ceco Steel Products Inc., New York; Charles H. Tompkins Co., Washington, general contractor; 60 tons, structurals, Barber & Ross, Washington.

220 tons, incinerator bin, Boston, to Barker Steel Co., Boston; Coleman Bros. Corp., Boston, general contractor.

110 tons, state highway bridge, Derby-Ansonia-Seymour expressway, Connecticut, to U.S. Steel Supply Division, U.S. Steel Corp., Boston; L. D. DeFalice & Son Inc., North Haven, Conn., general contractor.

REINFORCING BARS PENDING

100 tons or more, three Oregon state highway bridges, Clatsop county; Workman & Wilson, Canby, general contractor, low at $119,867.

90 tons, also reinforced concrete pipe and miscellaneous metal, 10-mile waterway, Wahluke project, Washington state; A. R. Sims, Kennewick, low at $321,156 to the Bureau of Reclamation.

40 tons, also gates, pumps, valves, and miscellaneous, two water storage reservoirs and pump plant; bids to Grangeville, Idaho, June 17.

PLATES . . .

PLATES PLACED

700 tons, piling for Seward, Alaska, water terminal for Alaska Railroad, to the Columbia-Geneva Steel Division, U.S. Steel Corp., San Francisco.

204 tons, water tank for Mukilteo, Wash., to the American Pipe & Construction Co., Portland, Oreg.

200 tons, water storage tank, District No. 97, Seattle, to Pittsburgh-Des Moines Steel Co., Seattle.

100 tons plus, storage tank, Sylvan district, Portland, Oreg., to American Pipe & Construction Co., Portland, Oreg.

PLATES PENDING

1200 tons, 6.5-mile water supply line, Aberdeen, Wash.; McKay & Carlin, Aberdeen, apparently low, $513,579 for concrete cylinder pipe, $527,125 for ¼-in. steel plates, pipe 28-in. diameter.

100 tons plus, Army installation, Cape Lisburn, Alaska; bids in.

100 tons or more, 120,000-gal storage tank, also steel hangar for National Guard, Anchorage, Alaska; bids to U.S. Engineer, June 19.

PIPE . . .

CAST IRON PIPE PLACED

300 tons, 20 and 16 in., Seattle, to the Pacific States Cast Iron Pipe Co., Seattle.

200 tons, 20 and 16 in., Bremerton, Wash., to the Pacific States Cast Iron Pipe Co., Seattle.

STEEL PIPE PENDING

800 tons, fabricated pipe, municipal sewage disposal department, Reading, Pa.; bids asked.

RAILS, CARS . . .

RAILROAD CARS PLACED

Alaska Railroad, fifty 70-ton coal hopper cars to the General American Transportation Corp., Chicago, $486,824.

RAILROAD CARS PENDING

New York Central, 2000 hopper cars and 500 gondola cars for its affiliated line, Pittsburgh & Lake Erie, bids asked.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa., 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $255, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Steel Ingot Production—May 1957

Period	—OPEN HEARTH— Net tons	Per cent of capacity	——BESSEMER—— Net tons	Per cent of capacity	——ELECTRIC—— Net tons	Per cent of capacity	———TOTAL——— Net tons	Per cent of capacity
1957								
January ..	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
February .	8,898,671	99.2	277,682	80.4	810,853	87.8	9,987,206	97.6
March	9,442,164	95.1	275,156	71.9	871,754	85.2	10,589,074	93.4
1st Qtr. ..	28,170,526	97.7	847,677	76.3	2,566,839	86.4	31,585,042	96.0
*April	8,820,328	91.8	231,731	62.6	762,721	77.1	9,814,780	89.5
†May	8,837,000	89.9	202,000	52.8	769,000	75.2	9,808,000	86.5
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February .	9,043,064	101.3	296,543	78.0	799,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
June	8,665,044	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
2nd Qtr. ..	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
1st 6 Mo. .	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
July	1,330,151	13.9	.....	....	292,012	30.5	1,622,163	14.9
August ...	7,213,274	75.6	189,564	46.6	719,759	75.3	8,122,597	74.5
September..	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
3rd Qtr. ..	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
9 Mo.	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
October ...	9,841,002	103.2	330,101	81.2	877,410	91.8	11,048,513	101.3
November .	9,430,248	102.2	295,827	75.2	829,425	89.6	10,555,500	100.0
December .	9,695,919	101.6	308,465	75.9	833,161	87.1	10,837,545	99.4
4th Qtr. .	28,967,169	102.3	934,393	77.4	2,539,996	89.5	32,441,558	100.3
2d 6 Mo..	46,853,390	82.8	1,410,935	58.5	4,344,652	76.5	52,608,977	81.3
Total 1956	102,840,585	91.6	3,227,997	67.4	9,147,567	81.2	115,216,149	89.8

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128, 363,090 net tons.

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1957, as follows: Open hearth 116,912,410 net tons, bessemer 4,505,000 net tons, electric 12,041,740 net tons, total 133,459,150 net tons.

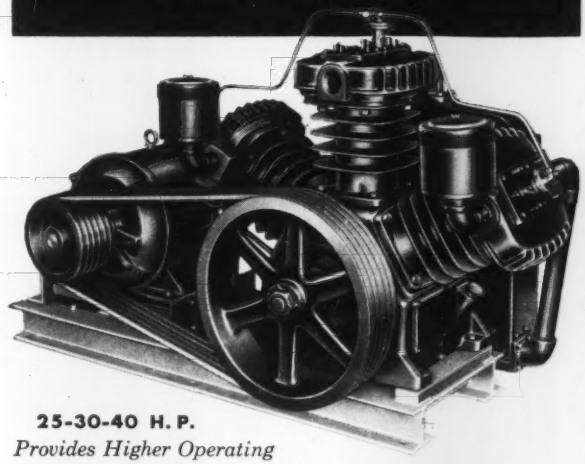
*Revised. †Preliminary figures subject to revision.

CURTIS MODEL C-100

Two-Stage, Air-Cooled Air Compressor

Delivers *MORE* Air...

PER MINUTE HORSEPOWER KILOWATT HOUR OF ELECTRICAL ENERGY CONSUMED



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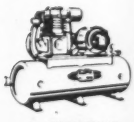

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Scrap Prices Pointing Higher

Increases push STEEL's index on steel grades to $55.67. End of advance not in sight, with supplies limited and steel production prospects promising

Scrap Prices, Page 176

Pittsburgh—A major mill paid $57 for No. 1 heavy melting scrap last week, boosting prices on the major grades $5 to $6 a ton. Scarcity of quality scrap explains the sharp advance in the face of a probable decline in steel operations next month. The advance was held to heavy melting scrap, bundles and railroad grades. No. 1 railroad heavy melting also rose $5 a ton in latest sales. Turnings, borings and cut structurals are inactive.

Philadelphia—The scrap market is strong here. No. 2 bundles have jumped sharply to $48-$50, delivered, with the outside figure established on substantial buying by the Fairless Works, U.S. Steel Corp. Several of the minor grades of steel scrap have also advanced. Other open-hearth grades and cast are strong, though unchanged.

The market isn't as bullish as it was. Higher prices have stimulated the flow of material to dealers' yards; exporters are showing some signs of resistance to the higher quotations in covering July needs.

New York—Brokers have advanced their buying prices on the open-hearth grades. They are offering $53-$55 for No. 1 heavy melting and No. 1 bundles; $43-$45 for No. 2 heavy melting; and $42-$43 for No. 2 bundles. They are quoting higher on low phos structurals and plate at $55-$56.

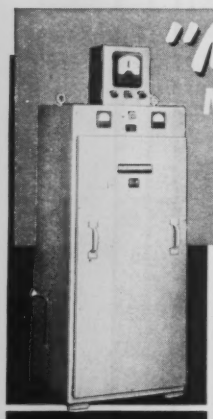
Supply is less stringent in machine shop turnings, mixed borings and turnings and short shoveling turnings.

Boston—Steel scrap prices are higher. No. 1 heavy melting steel is quoted $8 a ton above the low point in late April. No. 1 bundles and busheling follow this pace with buying mostly against orders for eastern Pennsylvania mills. The advance on the lighter grades—borings and turnings—is less pronounced.

Cleveland — Purchases by two Valley mills pushed steel scrap prices up another couple dollars last week. The rise was reflected here, although no local buying of consequence was reported. Cast grades are up on limited purchasing by several foundries. A supply shortage appears to be the chief factor for strength.

St. Louis — Further tightening of scrap supplies has sent prices up $1 to $5 a ton. Mill receipts are less than daily melts, trimming stockpiles. The inflow of material to the market shows no signs of improving. Speculative buying by dealers is gaining.

Chicago—A district mill entered the scrap market last week, and prices continued edging upward. No. 1 industrial heavy melting steel went at $54, No. 1 railroad heavy melting at $59. Most other major grades carried price



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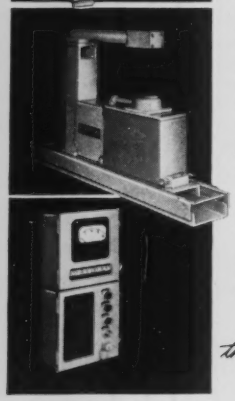

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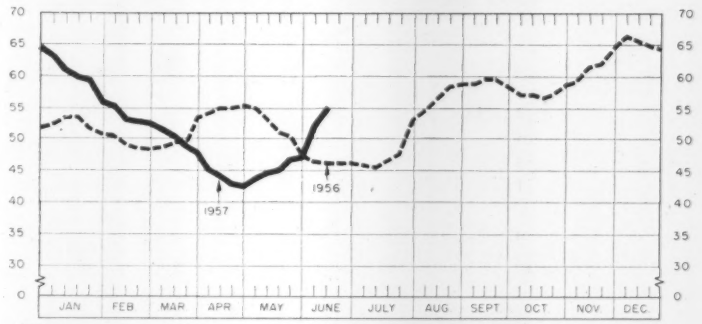
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL



June 12 1957	Week Ago	Month Ago	Year Ago	May Avg.
$55.67	$52.33	$45.00	$46.00	$45.75

tags ranging as much as $5 above the preceding week's quotations.

One broker reported that 90 per cent of No. 2 bundles—now up to $42—are being bought to cover a mill order dating back to March when the price was $33.

The weather, coupled with the price boost, is stimulating scrap collection, and dealer inventories are expected to rise. There is some concern that they had reached low levels.

Stainless steel scrap has advanced $5, and there's a feeling that a further increase is ahead. Recent stainless prices have not followed other scrap advances.

Detroit—Scrap prices jumped all over the lot on the last auto list closings, dealers and brokers seeking to fill empty yards. One dealer paid up to $7 for No. 1 bundles. Few outside mill orders have been received, but local mills apparently will take most of the scrap now being generated. The industry thinks this is the prelude to a general pickup in mill demand.

Buffalo—Scrap prices jumped with the award of June mill contracts and small lot buying by specialty consumers. No. 1 heavy melting rose to $46-$47, up $6 from the May level. No. 2 heavy melting went up $3 to $40. No. 2 bundles advanced $3 to $37. Blast furnace grades also went up an average of $3 a ton.

Some sharp advances were scored in the railroad grades, random length rails rising to $61-$62, rail crops to $66-$67 and railroad specialties to $59-$60.

Supplies are difficult to obtain. Mills are taking as much tonnage as they can get. Brokers are having difficulty covering their requirements on old commitments.

Cincinnati—The principal steelmaking grades have moved up another $1 a ton. No. 1 heavy melting is quoted $47-$48, brokers' buying price. Brokers attribute the strong market to scarce supply and spreading optimism that the steel rate will bound upward in late summer.

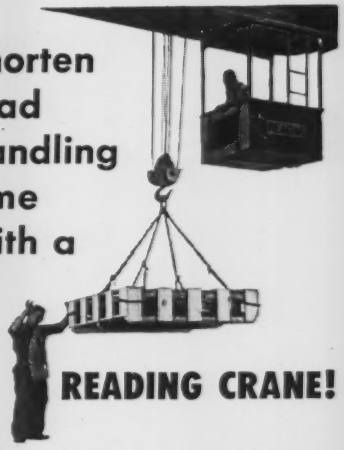
Birmingham — An open-hearth scrap consumer returned to the market last week after a long absence. It bought sizable tonnages of No. 1 heavy melting at $53, delivered; No. 2 heavy melting at $43; and No. 2 bundles at $41. Another mill also bought some heavy melting.

The market continues strong, with most grades in short supply. The cast market is unchanged. Exporters are paying $57-$58, f.a.s., for No. 1 heavy melting steel.

Los Angeles—Posted prices are unchanged, but No. 1 grades of scrap are reported selling below published quotations. Mills reportedly are more active in the market than they have been in recent weeks.

Seattle—The scrap market is steady here at the lower price levels recently quoted. Exports have declined because of price instability. Supplies are adequate for current consumption and mill inventories are comfortable.

Shorten load handling time with a



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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, June 12, 1957. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

June 12	$55.67
June 5	52.33
May Avg.	45.75
June 1956	46.04
June 1952	42.63

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*56.00-57.00*
No. 2 heavy melting	*50.00-51.00*
No. 1 factory bundles	*62.00-63.00*
No. 1 dealer bundles	*56.00-57.00*
No. 2 bundles	*47.00-48.00*
No. 1 busheling	*56.00-57.00*
Machine shop turnings	32.00-33.00
Mixed borings, turnings	32.00-33.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Cut structurals, 3 ft lengths	51.00-52.00
Cut structurals, 2 ft and under	52.00-53.00
Heavy turnings	44.00-45.00
Punchings & plate scrap	51.00-52.00
Electric furnace bundles	51.00-52.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable cast	44.00-45.00
Unstripped motor blocks	34.00-35.00
No. 1 machinery cast	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	*59.00-60.00*
Rails, 2 ft and under	*71.00-72.00*
Rails, 18 in. and under	*72.00-73.00*
Rails, random lengths	*65.00-66.00*
Railroad specialties	*67.00-68.00*

Stainless Steel Scrap

18-8 bundles & solids	300.00-310.00
18-8 turnings	190.00-210.00
430 bundles & solids	75.00-80.00
430 turnings	55.00-60.00

CLEVELAND

No. 1 heavy melting	*51.00-52.00*
No. 1 factory bundles	54.00-55.00
No. 2 heavy melting	*46.00-47.00*
No. 1 bundles	*51.00-52.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*51.00-52.00*
Machine shop turnings	20.00-21.00
Short shovel turnings	23.00-24.00
Mixed borings, turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut foundry steel	49.00-50.00
Cut structurals, plates 2 ft and under	*58.00-59.00*
Low phos. punchings & plate	*54.00-55.00*
Alloy free, short shovel turnings	26.00-27.00
Electric furnace bundles	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	*53.00-54.00*
Charging box cast	41.00-42.00
Heavy breakable cast	41.00-42.00
Stove plate	*50.00-51.00*
Unstripped motor blocks	*37.00-38.00*
Brake shoes	41.00-42.00
Clean auto cast	*54.00-55.00*
Burnt cast	39.00-40.00
Drop broken machinery	*56.00-57.00*

Railroad Scrap

No. 1 R.R. heavy melt	*57.00-58.00*
R.R. malleable	61.00-62.00
Rails, 2 ft and under	73.00-74.00
Rails, 18 in. and under	74.00-75.00
Rails, random lengths	68.00-69.00
Cast steel	*63.00-64.00*
Railroad specialties	*65.00-66.00*
Uncut tires	*63.00-64.00*
Angles, splice bars	*65.00-66.00*
Rails, rerolling	71.00-72.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	300.00-310.00
18-8 turnings	200.00-210.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*54.00-55.00*
No. 2 heavy melting	*49.00-50.00*
No. 1 bundles	*54.00-55.00*
No. 2 bundles	*46.00-47.00*
No. 1 busheling	*54.00-55.00*
Machine shop turnings	20.00-21.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	*57.00-58.00*
Electric furnace bundles	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt	*61.00-62.00*

CHICAGO

No. 1 hvy melt., indus.	*55.00-56.00*
No. 1 hvy melt., dealer	*52.00-53.00*
No. 2 heavy melting	*47.00-48.00*
No. 1 factory bundles	*58.00-59.00*
No. 1 dealer bundles	*53.00-54.00*
No. 2 bundles	*41.00-42.00*
No. 1 busheling, indus.	*53.00-54.00*
No. 1 busheling, dealer	*51.00-52.00*
Machine shop turnings	*33.00-34.00*
Mixed borings, turnings	33.00-34.00
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut steructurals, 3 ft	49.00-50.00
Punching & plate scrap	50.00-51.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	*45.00-46.00*
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt	*58.00-59.00*
R.R. malleable	56.00-58.00
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Angles, splice bars	*64.00-65.00*
Rails, rerolling	*66.00-67.00*

Stainless Steel Scrap

18-8 bundles & solids	*315.00-320.00*
18-8 turnings	*215.00-220.00*
430 bundles & solids	*75.00-80.00*
430 turnings	*55.00-60.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	33.00-34.00
No. 1 bundles	*46.00-47.00*
No. 2 bundles	33.00-34.00
No. 1 busheling	*45.00-46.00*
Machine shop turnings	*27.00-28.00*
Mixed borings, turnings	*28.00-29.00*
Short shovel turnings	*29.00-30.00*
Punchings & plate scrap	*56.00-57.00*

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	41.00
Stove plate	41.00
Heavy breakable	36.00
Unstripped motor blocks	28.00
Clean auto cast	48.00
Malleable	52.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*44.00*
No. 2 heavy melting	*40.00*
No. 1 bundles	*44.00*
No. 2 bundles	*35.00*
No. 1 busheling	*44.00*
Machine shop turnings	*30.00*
Short shovel turnings	*32.00*

Cast Iron Grades

No. 1 cupola	*48.00*
Charging box cast	*40.00*
Heavy breakable cast	*40.00*
Unstripped motor blocks	*40.00*
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	*41.00*

Railroad Scrap

No. 1 R.R. heavy melt	*53.00*
Rails, 18 in. and under	*69.00*
Rails, rerolling	*69.00*
Rails, random lengths	65.00
Angles, splice bars	*61.00*

PHILADELPHIA

No. 1 heavy melting	56.00-57.00†
No. 2 heavy melting	48.00-49.00
No. 1 bundles	58.00
No. 2 bundles	*48.00-50.00*
No. 1 busheling	58.00
Electric furnace bundles	58.00-59.00
Mixed borings, turnings	*40.00†*
Short shovel turnings	*42.00*
Machine shop turnings	*39.00*
Heavy turnings	52.00-53.00
Structurals & plate	58.00-60.00
Couplers, springs, wheels	*64.00†*
Rail crops, 2 ft & under	*70.00-72.00*

Cast Iron Grades

No. 1 cupola	46.00
Heavy breakable cast	55.00
Malleable	62.00
Drop broken machinery	57.00-58.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*53.00-55.00*
No. 2 heavy melting	*43.00-45.00*
No. 1 bundles	*53.00-55.00*
No. 2 bundles	*42.00-43.00*
Machine shop turnings	29.00-29.50
Mixed borings, turnings	29.00-29.50
Short shovel turnings	31.00-32.00
Low phos. (structural & plate)	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Unstripped motor blocks	35.00-36.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips solids	280.00-290.00
18-8 borings, turnings	180.00-190.00
430 sheets, clips, solids	60.00-70.00
410 sheets, clips, solids	50.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*42.00-43.00*
Machine shop turnings	*24.00-25.00*
Mixed borings, turnings	25.00-25.50
Short shovel turnings	*27.00-28.00*
No. 1 cast	34.00-35.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	42.00-43.00

BUFFALO

No. 1 heavy melting	*46.00-47.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	*46.00-47.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*46.00-47.00*
Mixed borings, turnings	*32.00-33.00*
Machine shop turnings	*30.00-31.00*
Short shovel turnings	*33.00-34.00*
Cast iron borings	*32.00-33.00*
Low phos.	*51.00-52.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	41.00-42.00
No. 1 machinery	46.00-47.00

Railroad Scrap

Rails, random lengths	*61.00-62.00*
Rails, 3 ft and under	*66.00-67.00*
Railroad specialties	*59.00-60.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*46.00-47.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*46.00-47.00*
No. 2 bundles	*39.00-40.00*
No. 1 busheling	*46.00-47.00*
Machine shop turnings	30.00-31.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	33.00-34.00
Cast iron borings	28.00-29.00
Low phos. 18 in.	54.00-55.00

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Heavy breakable cast	42.00-43.00
Charging box cast	42.00-43.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	*52.00-53.00*
Rails, 18 in. and under	*70.00-71.00*
Rails, random lengths	*62.00-63.00*

BIRMINGHAM

No. 1 heavy melting	*48.00-49.00*
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	*48.00-49.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*48.00-49.00*
Cast iron borings	*31.00-32.00*
Short shovel turnings	35.00-36.00
Machine shop turnings	33.00-34.00
Bar crops and plates	*53.00-54.00*
Structurals & plate	*52.00-53.00*
Electric furnace bundles	*49.00-50.00*
Electric furnace:	
3 ft and under	*47.00-48.00*
2 ft and under	*48.00-49.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	49.00-50.00
Stove plate	49.00-50.00
Unstripped motor blocks	41.00-42.00
Charging box cast	34.00-35.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt	*53.00-54.00*
Rails, 18 in. and under	*62.00-63.00*
Rails, rerolling	*62.00-63.00*
Rails, random lengths	*57.00-58.00*
Angles, splice bars	57.00-58.00

SEATTLE

No. 1 heavy melting	45.00
No. 2 heavy melting	42.00
No. 1 bundles	42.00
No. 2 bundles	26.00
Machine shop turnings	28.00
Mixed borings, turnings	28.00
Electric furnace No. 1	52.00

Cast Iron Grades

No. 1 cupola	48.00
Heavy breakable cast	45.00
Unstripped motor blocks	37.50
Stove plate (f.o.b. plant)	37.00

LOS ANGELES

No. 1 heavy melting	46.00
No. 2 heavy melting	43.00
No. 1 bundles	45.00
No. 2 bundles	33.00
Machine shop turnings	32.00
Shoveling turnings	34.00
Cast iron borings	31.00
Cut structural and plate, 1 ft and under	57.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	52.00

Railroad Scrap

No. 1 R.R. heavy melt	46.00

SAN FRANCISCO

No. 1 heavy melting	48.00
No. 2 heavy melting	43.00
No. 1 bundles	47.00
No. 2 bundles	35.00
Machine shop turnings	32.00
Mixed borings, turnings	32.00
Cast iron borings	32.00
Heavy turnings	32.00
Short shovel turnings	34.00
Cut structurals, 3 ft	60.00

Cast Iron Grades

No. 1 cupola	53.00
Charging box cast	45.00-47.00
Stove plate	46.00
Heavy breakable cast	40.00
Unstripped motor blocks	48.00
Clean auto cast	55.00
No. 1 wheels	48.00
Drop broken machinery	53.00

HAMILTON, ONT.

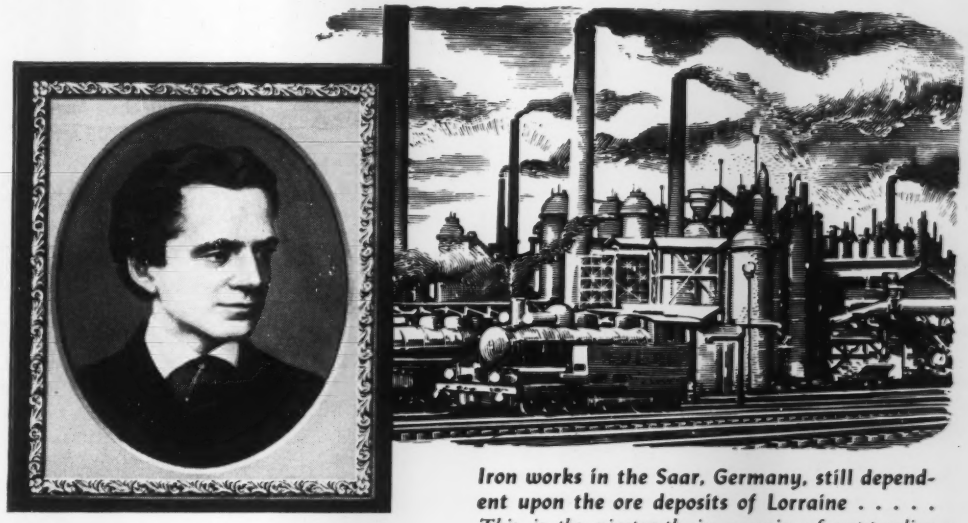
No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	35.00
Mixed borings, turnings	19.00
Busheling, new factory: Prepared	43.00
Unprepared	37.00
Short steel turnings	30.00
Rails, rerolling	49.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING



Sidney Gilchrist Thomas

Iron works in the Saar, Germany, still dependent upon the ore deposits of Lorraine . . . . .
This is the nineteenth in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1878 – Steel from the Mines of Lorraine

They lighted the skies over the "Pittsburgh" of Europe when they charged the bessemers with the abundant high phosphorus ores of Lorraine. While the Bessemer converter heralded the "Age of Steel," it was ushered in by the process developed by Sidney Gilchrist Thomas and his cousin, Percy Gilchrist.

Lined with acid refractories, the original converters could not eliminate phosphorus and unless iron of low phosphorus content was used in the charge, the resultant steel was brittle and hard to work.

By lining the converter with basic material – magnesian limestone, and adding burned lime to the metal during the blow, the Thomas-Gilchrist process effectively removed objectionable phosphorus from the steel. This development permitted the use of high phosphorus iron and scrap and opened the vast Lorraine deposits of France, Germany, Luxembourg and Belgium to the steelmakers of Europe.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

U. S. Buoys Zinc Industry

Slack domestic market causes some cutbacks in production. More will follow if shipments don't pick up. Titanium sponge prices drop 50 cents a pound

Nonferrous Metal Prices, Pages 180 & 181

DOMESTIC ZINC shipments increased slightly in May but not enough to bring the industry out of its doldrums. Deliveries to the government are keeping the zinc industry out of a "famine."

During the first five months of this year, 103,327 tons of zinc have been shipped to the government. It went to the long range strategic stockpile and the barter program (foreign origin zinc is traded for surplus American grain).

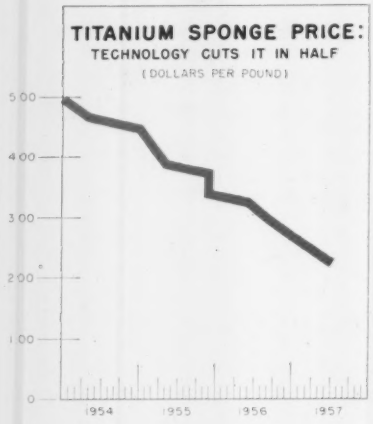
Century Mark—U.S. producers' stocks rose from 68,622 tons in January to 105,531 tons on June 1, the first time they have been over 100,000 tons since October.

Total U.S. shipments in May reached 89,611 tons, to bring the figure for the first five months to 427,813 tons. The average monthly total has been 85,563 tons. Domestic zinc shipments held steady at slightly over 67,000 tons for the first three months of the year, dropped to 55,000 tons in April and rose to about 60,000 tons in May.

Production has been holding steady at slightly over 96,000 tons for the last three months. Total 1957 production to date: 471,815 tons. If production continues at this pace, year-end totals could hit a new peak of 1.13 million tons. But don't look for a record unless domestic shipments pick up. One reason: American Zinc, Lead & Smelting Co. has reduced production at its Ft. Smith, Ark., facilities by 40 per cent. Its smelter at Dumas, Tex., will cut production by 10 per cent on July 1. Other producers may follow suit.

Tariff—Rumor has it that the Canadian government expects the U.S. will raise its tariff on lead and zinc in the near future. This will reportedly keep out part of the $50 million worth of these metals Canada exports annually to the U.S.

Demand for lead and zinc is off.



The markets may show little improvement until fourth quarter orders begin to flow in. As expected, lead fell a cent a pound (June 11). The new price is 14 cents.

Titanium Price Drops

Titanium sponge prices have been cut about 20 per cent (see chart). The price of grade A-1 sponge has been reduced from $2.75 a pound to $2.25; grade A-2 from $2.50 to $2; and grade A-2 fine from $2.15 to $1.65. E. I. du Pont de Nemours & Co. initiated the price drop which has been followed by other major producers.

Foreign Uses Boost Copper

Copper sales to the foreign market continue at an excellent clip. Roy H. Glover, chairman, Anaconda Co., New York, puts it this way: "The demand for basic materials in Europe is insatiable. A new middle class is evolving that is demanding and obtaining in increasing quantities automobiles, radios, television sets, refrigerators, improved plumbing, modern heating and new homes."

Aluminum: New Horizon

The Pennsylvania Railroad will install 50 welded aluminum boxcar doors on standard freight cars. Kaiser Aluminum & Chemical Corp. developed them.

The strike at Aluminium Ltd.'s Arvida, Que., smelter continues. Some 1000 tons of aluminum ingots are being lost each day.

Silver Price Eases

Handy & Harman, New York, quotes the New York silver price at 90.625 cents a fine ounce (June 10,) off ¼-cent. It's the lowest price in ten months.

The firm said normal supply-demand factors are behind the reduction. The price was last changed on May 28 when it fell ½-cent.

NONFERROUS PRICE RECORD

	Price June 12	Last Change	Previous Price	May Avg.	Apr. Avg.	June, 1956 Avg.
Aluminum	27.10	Aug. 10, 1956	25.90	27.100	27.100	25.900
Copper	30.00–32.00	May 9, 1957	30.50–32.00	31.087	31.598	43.000
Lead	13.80	June 11, 1957	14.80	15.185	15.800	15.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	33.750
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	98.25	June 10, 1957	98.375	98.341	99.276	94.611
Zinc	11.00	June 4, 1957	11.50	11.923	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100-lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 30.00 deld.; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9% $2.25 per troy oz.

Iridium: $100-110 nom. per troy oz.

Lead: Common, 13.80; chemical, 13.90; corroding, 13.90, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 13 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (die casting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-100 per troy oz, nom.

Palladium: $23-24 per troy oz.

Platinum: $90-95 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: 99.5%, $12-15 per lb.

Silver: Open market, 90.625 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Rod, $58.06 per lb; sheet, $45.36 per lb.

Tellurium: $1.60-1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N.Y., spot and prompt, 98.25.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.75.

Zinc: Prime Western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.75 deld. Die casting alloy ingot No. 3, 15.25; No. 2, 16.25; No. 5, 15.75 deld.

Zirconium: Sponge, commercial grade, $10 per lb.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 22.50-28.25, No. 12 foundry alloy (No. 2 grade), 20.50-22.00; 5% silicon alloy, 0.60 Cu max., 24.00-24.50; 13 alloy, 0.60 Cu max., 24.00-24.50; 195 alloy, 23.50-25.25; 108 alloy, 21.00-22.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.25; grade 2, 20.50; grade 3, 19.50; grade 4, 18.75.

Brass Ingot: Red brass, No. 115, 30.50; tin bronze, No. 225, 40.00; No. 245, 34.50; high-leaded tin bronze, No. 305, 34.50; No. 1 yellow, No. 405, 25.00; manganese bronze, No. 421, 28.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.83-1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.50 per cwt; pipe, full coils, $19.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-12.00; wire, $7.50-11.50; forging billets, $6.00-8.10; hot-rolled and forged bars, $6.15-8.40.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.00; plates, 19.50.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.50-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. width or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
Rolled				
1.125-1.500	55.20	53.90	59.00	56.10
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.0.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 9.50-10.00; borings and turnings, 6.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	46.85	34.97d	47.39	49.76	21.250	21.000	19.375
Low Brass, 80%	49.80	49.74	50.34	52.61	23.750	23.500	23.000
Red Brass, 85%	50.84	50.78	51.38	53.65	24.750	24.500	24.000
Com. Bronze, 90%	52.43	52.42	53.02	55.04	25.750	25.500	25.500
Manganese Bronze	54.65	48.75	59.25	....	19.750	19.500	19.000
Muntz Metal	48.99	44.80	....	....	20.000	19.750	19.250
Naval Brass	50.91	45.22	57.97	54.32	19.750	19.500	19.000
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	63.56	65.89g	65.89	....	27.750	27.750	13.750
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

7.00; crankcases, 9.50-10.00; industrial castings, 9.50-10.00.

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 21.50-22.00; light copper, 19.75-20.25; No. 1 composition red brass, 20.00-20.50; No. 1 composition turnings, 19.50-20.00; yellow brass turnings, 11.50-12.00; new brass clippings, 18.00-18.50; light brass, 12.00-12.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 15.50-16.00; auto radiators, unsweated, 15.00-15.50; cocks and faucets, 16.50-17.00; brass pipe, 17.00-17.50.

Lead: Heavy 9.50-10.00; battery plates, 5.00-5.25; linotype and stereotype, 11.50-12.00; electrotype, 11.50-12.00; mixed babbitt, 12.00-12.50.

Monel: Clippings, 45.00-48.00; old sheets, 45.00-48.00; turnings, 35.00-38.00; rods, 45.00-48.00.

Nickel: Sheets and clips, 80.00-90.00; rolled anodes, 80.00-90.00; turnings, 65.00-75.00; rod ends, 80.00-90.00.

Zinc: Old zinc, 3.00-3.50; new die-cast scrap, 2.75-3.00; old die-cast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50; 3003 clippings, 16.50; 6151 clippings, 16.50; 5052 clippings, 16.00-16.50; 2014 clippings, 15.50-16.00; 2017 clippings, 15.50-16.00; 2024 clippings, 15.50-16.00; mixed clippings, 15.00; old sheets, 13.00-13.50; old cast, 13.00-13.50; clean old cable (free of steel), 15.50-16.50; borings and turnings, 13.50-14.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.25; light copper, 22.00; refinery brass (60% copper) per dry copper content, 23.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.25; light copper, 22.00; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 17.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42. 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 101.50; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 116.50; 200-499 lb, 115.00; 500-999 lb, 114.50; 1000 lb or more, 114.00.

Zinc: Balls, 18.59; flat tops, 18.25; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 24.35; 200 lb, 21.35; 300 lb, 20.35; 400 lb, 19.85; 500 lb, 18.35; 2000 lb, 16.10; 6000 lb, 15.85; 12,000 lb, 15.60, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 77.40; 100-600 lb, 68.20; 700-1900 lb, 65.50; 2000-9900 lb, 63.60; 10,000 lb or more, 62.30.

Stannous Chloride (anhydrous): Less than 25 lb, 167.10; 25 lb, 132.10; 100 lb, 117.10; 400 lb, 114.70; 5200-19,600 lb, 102.50; 20,000 lb or more, 90.30.

Stannous Sulphate: Less than 50 lb, 129.80; 50 lb, 99.80; 100-1900 lb, 97.80; 2000 lb or more, 95.80.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

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SALE OF VANADIUM PENTOXIDE

The Atomic Energy Commission has on hand at Grand Junction, Colorado, approximately 4¼ million pounds of fused vanadium pentoxide (V_2O_5) which has been determined to be surplus to the needs of the Government. This V_2O_5 is contained in the vanadium concentrate packed in 30-gallon steel drums.

To avoid significant impact on commercial markets, which might occur should all of this material be sold at one time, as well as to obtain the best recovery to the Government, the AEC has been working closely with the Business and Defense Services Administration, Department of Commerce to determine how much V_2O_5 should be sold at what intervals. As a result, the AEC has developed a sales program whereby approximately one-half million pounds of contained V_2O_5 will be offered for sale, periodically, probably at intervals of from four to eight months, depending upon market conditions.

It is the opinion of AEC and BDSA that the sale of V_2O_5 in this manner will not unduly affect the commercial market. However, the AEC will carefully evaluate the results of each offering and, with the continued assistance of BDSA, will make such adjustments in the sales program as may be in the best interests of the Government and which will have the minimum impact upon industry.

In consideration of the foregoing, the AEC does not intend to sell any V_2O_5 at a price that does not bear a reasonable relationship to the present market price for carload sales, which our studies indicate have been averaging about $1.22/lb. FOB Grand Junction. This average price does not include sales under term contracts and for less than carload lot sales, which have been averaging lower and higher respectively.

The first offering will be made June 5, 1957, with bids to be received at Grand Junction, Colorado, by 2:00 P.M., July 5, 1957. Copies of the invitation to bid and further information may be obtained from the **Manager, Grand Junction Operations Office, Atomic Energy Commission, Grand Junction, Colorado.**

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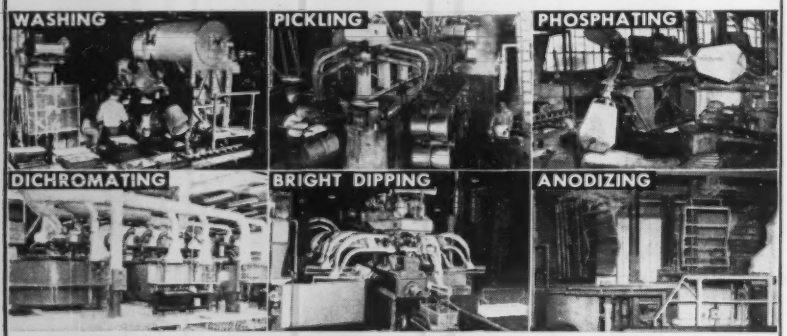

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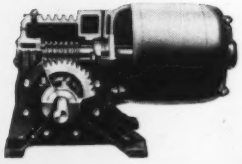

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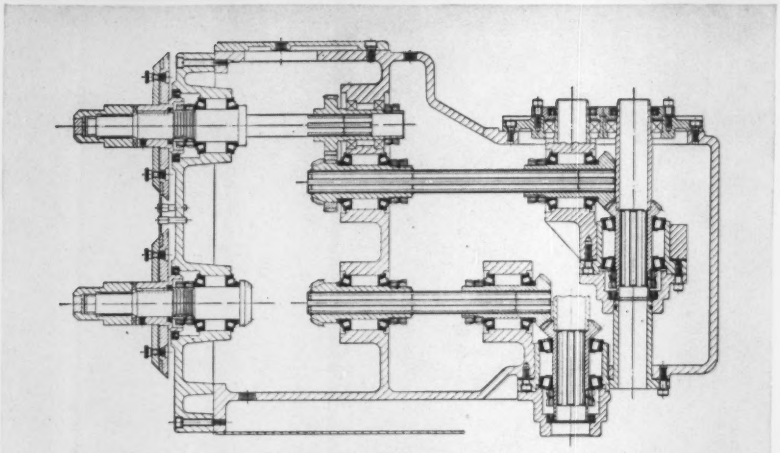

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This symbol on a product means its bearings are the best.

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